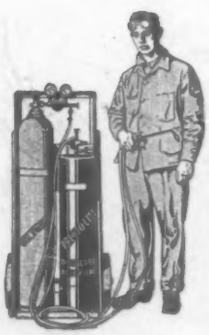
Send me a sample of your work. See announcement in this issue on page 31.

Notice to Readers.—When you finish reading this magazine place a 1-cent stamp on this notice, hand same to any postal employee, and it will be placed in the hands of our soldiers or sailors at the front. No wrapping; no address.
A. S. Burleson, Postmaster General.

The Welding Engineer

Vol. II. Chicago 608 S. Dearborn St. NOVEMBER, 1917 $2.00 per year in U. S. $2.50 per year abroad No. 11

Prest-O-Lite
Acetylene Service



Offers Real Help to You

A BIG, live, interesting topic now engaging the attention of many men in the metal working industries is oxy-acetylene welding. The many remarkable, profitable uses of this process—such as manufacturing metal products, constructing pipe lines and piping systems, repairing broken operating machinery and defective castings, etc.—have led to its extensive employment by America's most important industries. No other method of metal joining has such great possibilities for savings of time, labor and material.

We want *you* to regard Prest-O-Lite Service as a source of real, practical advice and help on your welding problems. Our engineers are ready and willing to heartily co-operate with you, to help overcome your difficulties. We have on file an immense fund of valuable data on welding. This information is at *your* service. No welding problem is too large or too small to enlist our co-operation.

Welders find the Prest-O-Lite Welding Instruction Book full of valuable information. If you are in the welding business we will send you a free copy if you ask.

The Prest-O-Lite Co., Inc.
U. S. Main Office and Factory, 851 Speedway, Indianapolis, Ind.
Canadian General Office and Factory, Dept. B. 1, Toronto, Ont.
59 Branches and Charging Plants, in Principal Industrial Centers

World's Largest Makers of Dissolved Acetylene

For the Army Welders are wanted at once. The attention of readers is directed to announcements in this issue.

Oxweld Equipment operates efficiently on gases other types waste.

Oxweld Service Men Know

The expert operators of our service department have inside knowledge of the work that has been done in our great welding shops and laboratories.

They are familiar with all the factors in the successful handling of the thousands of welding and cutting jobs brought us to date.

We solicit an opportunity to demonstrate the value of the service which this staff of specialists are rendering to those entitled to it.

Oxweld Acetylene Co.

Newark, N. J. Chicago Los Angeles

World's Largest Makers of Oxy-Acetylene Apparatus and Supplies

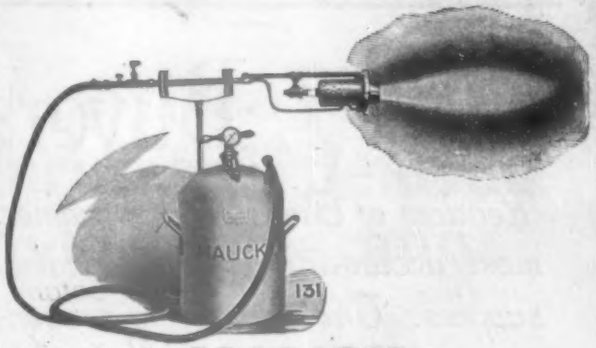
MILBURN APPARATUS

Milburn mixing principle produces best work with minimum gas, and no flash backs, burnt tips, or other annoyances.

Exceptionally durable construction of torches insures long, satisfactory service. Regulators dependable and free from valve, diaphragm and gauge troubles.

Ask for Catalogue No. 35.

The Alexander Milburn Company
Baltimore, Maryland



HAUCK
Kerosene Preheater

in connection with your Welding Torch. Reduce the welding time and cut the oxygen and acetylene bills more than half and turn out better work.

HAUCK MFG. CO.
BROOKLYN, N. Y.

Our Service Plan
Xemplifies that
When your Railroad Company
Enjoys the use of it and a
Lot of Oxweld Equipment
Demands for power to the

R.ound House Foreman will

R.eceive no refusals

Simply because the Repair Force is
Efficient in every respect as a
Result of having been instructed in
Virtually every known application of
Incomparable Oxy-Acetylene Welding and
Cutting Equipment, which means
Economy and Efficiency.

Oxweld Railroad Service Co.
Chicago New York

THE

K G
TORCH

★

It is a well established fact that the **"torch"** is the most important unit of an oxy-acetylene welding and cutting equipment.

The K-G Torch has a reputation in the trade which speaks for itself. We will gladly demonstrate the torch at any time and we guarantee it to be equal to any and better than most on the market today. Finally, the price will leave no argument open.

The Complete K-G Welding and Cutting Equipment is in every detail as reliable and efficient as the K-G Torch. All K-G supplies are guaranteed to be the highest quality goods.

Torches, Regulators, Hose, Gloves, Gauges, Goggles, Welding Rods, Wire and Flux, Oxygen, Acetylene and Blau Gas.

K-G Welding & Cutting Co.
(INCORPORATED)
556 West 34th St., NEW YORK CITY

Buyers' Index

Readers of The Welding Engineer will find this index to contain the most accurate information obtainable relating to welding apparatus and supplies. The advertising section includes the principal manufacturers of the United States.

ACETYLENE (Compressed in Cylinders)
Commercial Acetylene Welding Co.
The Prest-O-Lite Co., Inc.
Universal Oxygen Co.

ACETYLENE CYLINDERS

ACETYLENE GENERATORS
Bermo Supply Co.
Davis-Bournonville Co.
The Harris Calorific Co.
Oxweld Acetylene Co.
Superior Oxy-Acetylene Machine Co.
Vulcan Process Co.

ALUMINUM FILLER RODS
American Welding Co.
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Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Hauck Mfg. Co.
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The Prest-O-Lite Co.
Superior Oxy-Acetylene Mach. Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

ALUMINUM FLUX
American Welding Co.
Bermo Supply Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Hauck Mfg. Co.
Morey Flux & Chemical Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

ALUMINUM SOLDER
Vulcan Process Co.

ANNEALING FURNACES
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Universal Oxygen Co.

APRONS (Asbestos)

ASBESTOS GLOVES
Vulcan Process Co.

ASBESTOS SHEET PAPER
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Oxweld Acetylene Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

BLOW TORCHES (Acetylene)
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Bermo Supply Co.
Buffalo Dental Mfg. Co.
The Evieth-Lindsay Co.
Hauck Mfg. Co.
The Alexander Milburn Co.
The Prest-O-Lite Co.
Torchweld Equipment Co.
Vulcan Process Co.

BOOKS (Relating to Welding)
The Welding Engineer
P. F. Willis.

BRASS AND BRONZE FLUX
American Welding Co.
Ampco Rolling Mills Corp.
Hauck Mfg. Co.
Bermo Supply Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
United States Welding Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
Universal Oxygen Co.
Vulcan Process Co.

BRASS SPELTER WIRE
Universal Oxygen Co.
Vulcan Process Co.

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Hauck Mfg. Co.
Superior Oxy-Acetylene Machine Co.

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Ampco Rolling Mills Corp.
Hauck Mfg. Co.
Bermo Supply Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

BUTT WELDERS (Electric Resistance)
Thomson Electric Welding Co.

CARBIDE (Calcium)
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Union Carbide Sales Co.

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Carbo-Hydrogen Co. of America

CARBO-HYDROGEN
Carbo-Hydrogen Co. of America

CARBON (Blocks, Paste, Etc.)
National Carbon Co.

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Bermo Supply Co.
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The Evieth-Lindsay Co.
General Welding & Equipment Co.
The Harris Calorific Co.
Henderson-Willis Welding & Cutting Co.
The Imperial Brass Mfg. Co.
Messer Mfg. Co.
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The Prest-O-Lite Co., Inc.
Superior Oxy-Acetylene Mach. Co.
Universal Oxygen Co.
Vulcan Process Co.

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Bermo Supply Co.
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Davis-Bournonville Co.
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The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

CRANES (Portable)
H. G. Doran.

ELECTRIC ARC WELDING OUTFITS
The Lincoln Electric Co.
Westinghouse Electric & Mfg. Co.
General Electric Co.

ELECTROLYTIC OXYGEN PLANTS
International Oxygen Co.
Universal Oxygen Co.
Vulcan Process Co.

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Bierman-Everett Fdy. Co.
Hauck Mfg. Co.
United States Welding Co.
The Prest-O-Lite Co.
Vulcan Process Co.

FILLER RODS (Swedish Iron)
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Bermo Supply Co.
Davis-Bournonville Co.
Hauck Mfg. Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
Steel Sales Corp.
Universal Oxygen Co.
Vulcan Process Co.

FILLER RODS (Tobin Bronze)
American Welding Co.
Bermo Supply Co.
Bierman-Everett Fdy. Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
Steel Sales Corp.
Vulcan Process Co.
United States Welding Co.
Universal Oxygen Co.

FILLER RODS (Vanadium Steel)
American Welding Co.
Bermo Supply Co.
Bierman-Everett Fdy. Co.
Davis-Bournonville Co.
Hauck Mfg. Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Steel Sales Corp.
Torchweld Equipment Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

FIREPROOF PLASTIC
Bermo Supply Co.

FLUE WELDERS (Electric)
Westinghouse Electric & Mfg. Co.

FURNACES (Annealing)
Buffalo Dental Mfg. Co.
Hauck Mfg. Co.
Universal Oxygen Co.

GASOLINE PREHEATING FURNACES
Buffalo Dental Mfg. Co.
Hauck Mfg. Co.
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Superior Oxy-Acetylene Machine Co.

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Superior Oxy-Acetylene Machine Co.
Universal Oxygen Co.
Westinghouse Electric & Mfg. Co.
Vulcan Process Co.

GLOVES (Welders Asbestos)
Davis-Bournonville Co.
Vulcan Process Co.
William C. Adams

GOGGLES
Chicago Eye Shield Co.
F. A. Hardy & Co.
Vulcan Process Co.

GRINDING MACHINES

HARDENING FURNACES
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Hauck Mfg. Co.

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Carbo-Hydrogen Co. of America

HOSE (Oxygen and Acetylene)
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Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
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Superior Oxy-Acetylene Machine Co.
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United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

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Hauck Mfg. Co.
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Vulcan Process Co.

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Universal Oxygen Co.
Vulcan Process Co.

KEROSENE PREHEATING TORCHES
Alger Supply Co.
Hauck Mfg. Co.
Oxweld Acetylene Co.
Superior Oxy-Acetylene Machine Co.
Vulcan Process Co.

The Growth of Oxy-Acetylene Welding and Cutting and the Increasing Demand for Davis-Bournonville Apparatus

A Year Ago we said—

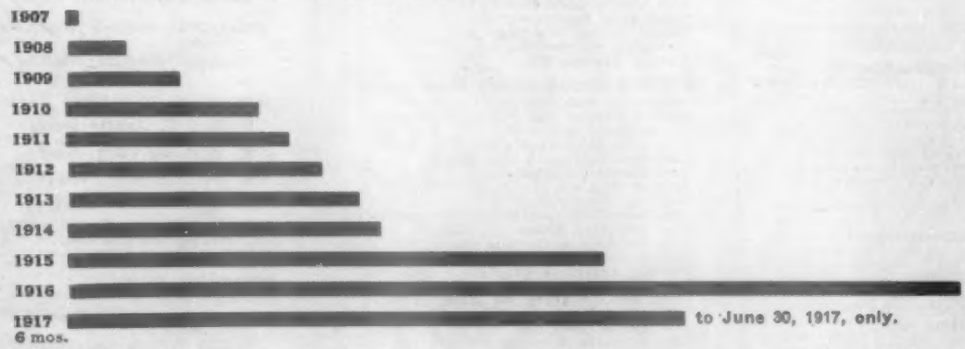
"The growth of Oxy-Acetylene Welding and Cutting in the United States is shown by the increasing use of Davis-Bournonville apparatus, which is inseparably associated with the development and success of the oxy-acetylene industry in this country.

"Ten years ago the process was unknown in the United States. Today it forms one of the great industries of the country, with its requirements for acetylene, oxygen and efficient apparatus.

"The Davis-Bournonville Company obtained the United States patents for the independent positive-pressure type of welding torch (mixing the gases in an interchangeable tip or nozzle) in 1906—basic principles which have been retained in the D-B torch because of their proven superiority through ten years of development, improvement and the most successful operation.

"There is more Davis-Bournonville welding and cutting apparatus in successful use in the United States than of any other make, and the prominent concerns which have established the greatest success with this process have large installations of D-B apparatus, with from ten to one hundred or more torch units, and from one to six of the largest acetylene generators."

Today—The increasing use of the oxy-acetylene process for welding and cutting and of Davis-Bournonville apparatus are parallel and are graphically shown by the sales of "Davis Apparatus" as charted below:



"Davis Apparatus" Leads the World in Range, Efficiency and Number of Successful Users. Write for bulletins and information showing why it is used by the largest steel mills, foundries, ship-yards, locomotive and car builders, U. S. Navy Yards and government works, mines, sheet metal working factories, tube and barrel welders, scrap yards, and in hundreds of small repair shops and garages.

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General Offices and Factory, Jersey City, N. J.

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BOSTON	CLEVELAND		DETROIT	SAN FRANCISCO
PHILADELPHIA	CINCINNATI		ST. LOUIS	TORONTO, ONT. (Carter Welding Co.)

DAVIS-BOURNONVILLE CO. DAVIS APPARATUS NEW YORK-CHICAGO

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The Bastian-Blessing Co.
Bermo Supply Co.
Buffalo Dental Mfg. Co.
K-G Welding & Cutting Co.
Superior Oxy-Acetylene Machine Co.
Vulcan Process Co.

OIL BURNERS (Preheating)
Alger Supply Co.
Oxweld Acetylene Co.
Superior Oxy-Acetylene Mach. Co.
Vulcan Process Co.

OXYGEN (Compressed in Cylinders)
Burdett Oxygen Co.
The Linde Air Products Co.
Swift & Co.
Universal Oxygen Co.
Vulcan Process Co.

OXYGEN CYLINDERS

PIPE WELDING
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PHOTOGRAPHS
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PRESSURE GAUGES
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Bastian & Blessing Co.
Bermo Supply Co.
Davis-Bournonville Co.
Hauck Mfg. Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
U. S. Gauge Co.
Torchweld Equipment Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

RAILROADS—Special Service for
Oxweld Railroad Service Co.

REGULATING VALVES (Acetylene)
American Welding Co.
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Bermo Supply Co.
Davis-Bournonville Co.
Hauck Mfg. Co.
The Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Oxweld Acetylene Co.
Superior Oxy-Acetylene Machine Co.
The Prest-O-Lite Co., Inc.
Torchweld Equipment Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

REGULATING VALVES (Carbo-Hydrogen)
Carbo-Hydrogen Co. of America

REGULATING VALVES (Hydrogen)
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The Bastian-Blessing Co.
Bermo Supply Co.
The Prest-O-Lite Co.
The Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
Universal Oxygen Co.
Vulcan Process Co.

REGULATING VALVES (Oxygen)
The Bastian-Blessing Co.
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Bermo Supply Co.
Davis-Bournonville Co.
The Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
Oxweld Acetylene Co.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

SCHOOLS OF WELDING

SEAM WELDERS (Electric)
General Electric Co.
Westinghouse Electric & Mfg. Co.

SEAM WELDERS (Electric Resistance)
Thomson Electric Welding Co.

SPOT WELDERS (Electric Resistance)
Thomson Electric Welding Co.

TANK CONNECTIONS (Oxygen and Acetylene Adaptors)
Superior Oxy-Acetylene Machine Co.

THERMALENE-GAS
The Thermalene Co.

THERMIT WELDING
Goldschmidt-Thermit Co.

TORCHES (Carbo-Hydrogen)
Carbo-Hydrogen Co. of America

TORCHES (Gasoline and Kerosene Preheating)
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Alger Supply Co.
Buffalo Dental Mfg. Co.
General Welding & Eq. Co.
The Imperial Brass Mfg. Co.
Hauck Mfg. Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Westinghouse Electric & Mfg. Co.
Vulcan Process Co.

TORCHES (Oxy-Acetylene Cutting)
American Welding Co.
Bermo Supply Co.
Davis-Bournonville Co.
The Evieth-Lindsay Co.
General Welding & Eq. Co.
The Harris Calorific Co.
Henderson-Willis Welding & Cutting Co.
The Imperial Brass Mfg. Co.
Messer Mfg. Co.
Welding Supply Co.
K-G Welding & Cutting Co.
The Alexander Milburn Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co., Inc.
Superior Oxy-Acetylene Machine Co.
The Thermalene Co.
Torchweld Equipment Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

TORCHES (Oxy-Acetylene Welding)
American Welding Co.
Bermo Supply Co.
Davis-Bournonville Co.
The Evieth-Lindsay Co.
General Welding & Eq. Co.
The Harris Calorific Co.
Messer Mfg. Co.
Welding Supply Co.
Henderson-Willis Welding & Cutting Co.
The Imperial Brass Mfg. Co.
K-G Welding & Cutting Co.
The Alexander Milburn Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co., Inc.
Superior Oxy-Acetylene Machine Co.
Torchweld Equipment Co.
The Thermalene Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

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American Welding Co.
Bermo Supply Co.
Davis-Bournonville Co.
The Evieth-Lindsay Co.
Messer & Co.
Welding Supply Co.
General Welding & Eq. Co.
The Harris Calorific Co.
Henderson-Willis Welding & Cutting Co.
The Alexander Milburn Co.
The Imperial Brass Mfg. Co.
Torchweld Equipment Co.
Vulcan Process Co.
Oxweld Acetylene Co.
Superior Oxy-Acetylene Machine Co.
Universal Oxygen Co.

TORCHES (Oxy-Hydrogen Welding)
American Welding Co.
Bermo Supply Co.
The Evieth-Lindsay Co.
Messer Mfg. Co.
Welding Supply Co.
Buffalo Dental Mfg. Co.
Davis-Bournonville Co.
Vulcan Process Co.
General Welding & Eq. Co.
The Harris Calorific Co.
Henderson-Willis Welding & Cutting Co.
The Imperial Brass Mfg. Co.
The Alexander Milburn Co.
Oxweld Acetylene Co.
Torchweld Equipment Co.
United States Welding Co.
Universal Oxygen Co.

TORCHES (Special to Order)
American Welding Co.
Bermo Supply Co.
The Harris Calorific Co.
Superior Oxy-Acetylene Machine Co.
Vulcan Process Co.

TRUCKS (Cylinder Carriers)
American Welding Co.
Davis-Burnonville Co.
The Imperial Brass Mfg. Co.
Oxweld Acetylene Co.
The Prest-O-Lite Co.
Superior Oxy-Acetylene Machine Co.
United States Welding Co.
Universal Oxygen Co.
Vulcan Process Co.

VALVES (For Oxygen Cylinders)
The Bastian-Blessing Co.
Universal Oxygen Co.
Vulcan Process Co.

WELDING (Electric Resistance-Custom Work)
Thomson Electric Welding Co.

WELDERS' GOGGLES
William C. Adams
Chicago Eye Shield Co.
F. A. Hardy Co.
Vulcan Process Co.

WELDING (Oxygen for)
The Linde Air Products Co.
Universal Oxygen Co.
Vulcan Process Co.

WELDING RODS
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Steel Sales Corp.
Vulcan Process Co.

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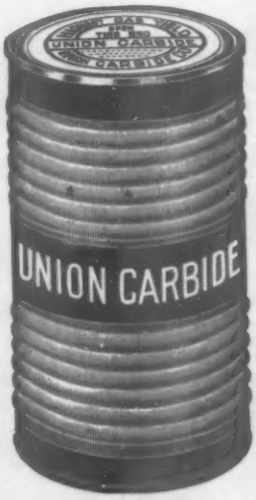

Packed in Blue and Gray Drums

Union Carbide Sales Company

New York City, 42nd St. Building — **Chicago, Ill., Peoples Gas Building** — **San Francisco, Cal., Kohl Building**

SOLE DISTRIBUTORS OF

UNION CARBIDE

"World's Best Quality—Highest Gas Yield"

For Oxy-Acetylene Welding Plants

Contractors' Flare Lights, Torches and Private and Municipal Lighting Plants

"Union Carbide" is packed in 100-lb. blue and gray drums marked conspicuously, "UNION CARBIDE."

The following sizes are carried in stock in 100-lb. drums:

3½ x 2 in. —a large size.

2 x ½ in. —a medium size.

1¼ x ⅜ in. —an intermediate size.

¼ x 1/12 in. —finely crushed size.

Union Carbide in the Generator sizes above listed will be shipped direct to consumers from a **Union Carbide Sales Co.** warehouse at any one of the following points where large stocks are kept on hand:

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Mobile—262-268 S. Water St.
Montgomery—114 N. Perry St.
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Phoenix—42 S. Central Ave.
ARKANSAS
Fort Smith—109-123 So. Ninth St.
CALIFORNIA
Eureka—109 Second St.
Fresno—932 H St.
Los Angeles—639 Gibbon St.
Sacramento—1523-31 Front St.
San Diego—326-336 Fifth St.
San Francisco—Kohl Building.
COLORADO
Denver—Nineteenth and Wazee Sts.
Victor—Third and Diamond Sts.
CONNECTICUT
Hartford—412 Trumbull St.
DISTRICT OF COLUMBIA
Washington—Maryland Ave. and 9th St., S. W.
FLORIDA
Jacksonville—106 E. Forsyth St.
Tampa—413 Tampa St.
GEORGIA
Atlanta—Cor. Haynes and Rhodes Sts., P. O. Box 1594.
Savannah—Ogeechee Canal, South of Bay St., P. O. Box 73.
ILLINOIS
Chicago—Peoples Gas Bldg., Michigan Blvd.
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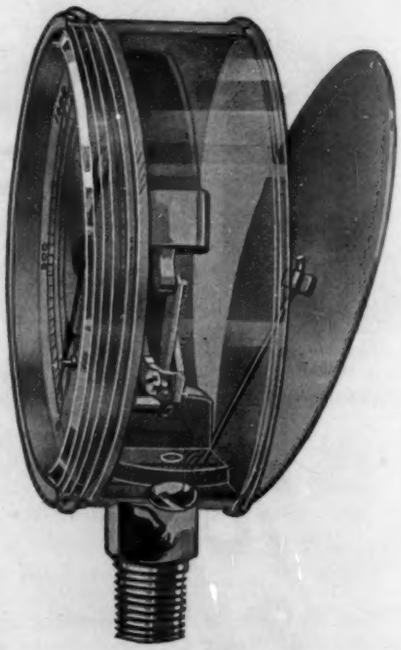

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"Today we are in need of an experienced welder. We want men who can earn their money. The writer has been at the game a long time and has reached the point where he is through teaching men the business. These men are an expense for the first six months, during which time they do not earn their salaries. As soon as they get to the earning point, they expect a big salary, and on account of carrying them through a losing period, we do not feel that we can afford to pay them a big salary, with the result that some competitor offers them a salary which the trainer is not justified in paying. We now want experienced men, who can start right out and the very first day earn his salary and a little better, and we think that there should be some central point where such requirements could be filled."

The Welding Engineer has filled many positions like this one and will fill many more. If you are a capable welder and would consider this position, or one like it, we would like to keep in touch with you. Fill out the following application blank and mail it to L. B. Mackenzie, 608 S. Dearborn St., Chicago. The information will be considered confidential and when we hear of a vacancy we will put you in touch with it.

L. B. Mackenzie, Date.....19....
608 S. Dearborn St., Chicago.

I would consider the offer of a position. I give you in confidence the following information about myself.

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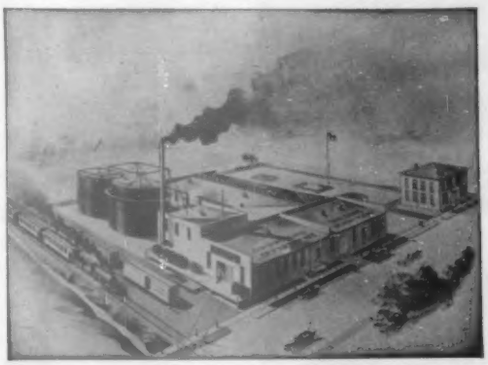

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Every experienced welder knows that the secret of success in welding is in preheating properly. Charcoal is expensive and slow. Most jobs can be handled more satisfactorily with a Vulcan oil burning preheating torch. The Vulcan weighs but 25 pounds and burns in any position. It gives a roaring flame, 24 inches long. The Vulcan is in use in welding shops everywhere. Write for booklet.

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The only Acetylene Oil Gas Producer in the world. Saves 25% on gas and oxygen. First class references.

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FOR HEAVY THICKNESSES

UP TO 22 INCHES

Welders Wanted for the Army

Skilled men in a great many different lines of trade are urgently needed at this time. Your Uncle Sam needs the co-operation of skilled specialists, especially welders. Automobile trucks must be kept in service, ambulances must not stand idle because of broken parts—work for the welder. A big railroad system, transporting our boys and their supplies, ammunition, etc., must not suffer from idle locomotives or other equipment, when a good welder could overcome the difficulty. Back of the lines big industrial plants must be kept in operation and welders must do their part.

Become a Non-Commissioned Officer

Men who enlist in the Ordnance Corps now (the "Army behind the Army") and possess proper qualifications will be made non-commissioned officers later.

What the Ordnance Corps Is

The Enlisted Ordnance Corps, National Army, into which the Ordnance Enlisted Reserve Corps has been merged, is charged with the supply, maintenance and repair of all cannon and artillery vehicles and equipment; all machines for the service and maneuver of artillery; all small arms, ammunition, harness, motor trucks, motor cycles, tractors and railroad cars; in fact, it is the Army behind the Army commonly known as "Service of the Rear."

Type of Men Wanted

There is a place for practically every man who knows a trade in the Enlisted Ordnance Corps. Machinists, mechanics, plumbers, painters, carpenters, canvas workers, auto mechanics, saddlers, blacksmiths and wheelwrights are especially needed at this time.

Applicants must be between 18 and 40 years, citizens or declarants, and be able to speak, read and write the English language, should have no absolute dependents, and must be able to pass a physical examination conforming to that prescribed for the Regular Army.

Place and Type of Service

If accepted for enlistment, men will ordinarily be sent to an arsenal school for a period of instruction, on completion of which they will be assigned to detachments, units or organizations, with ultimate service abroad. Previous military training, while preferable, is not essential, as men will continue the work which they pursue in civil life.

Pay and Grade

In view of the importance of their work a large number of men will serve as non-commissioned officers. Original enlistment is required as private, but later courses of training or special qualifications quickly lead to higher grades. Pay ranges from $30 to $97.20 a month, depending upon demonstrated ability and place of service. Men enlist for duration of war only.

Free quarters, rations, clothing, bedding, medical attendance, etc., are provided.

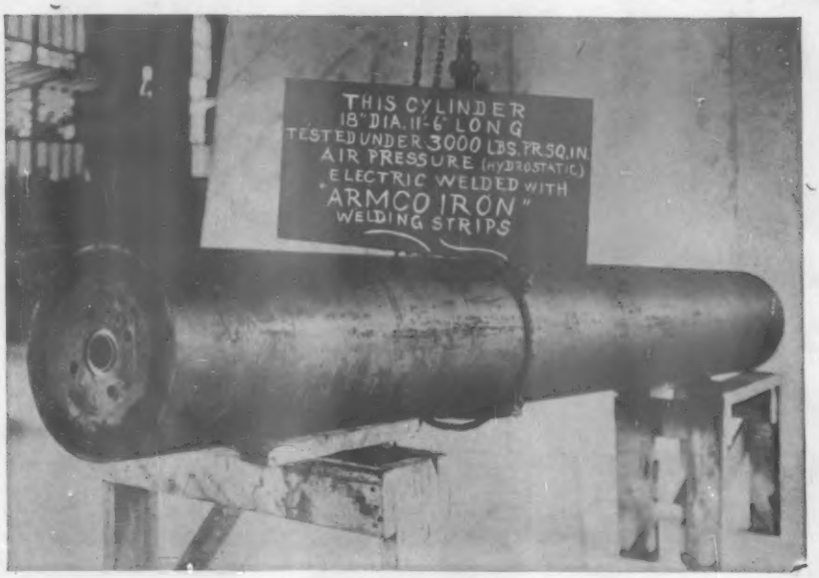
Relation to the Draft

Men registered under the Selective Service Law may voluntarily enlist prior to the posting of their names by their Local Boards. No man who has been called to appear for physical examination is eligible for enlistment in any branch of the military service. In case such men do enlist, the department under which they have enlisted will be requested to discharge them and direct them to report to their local boards.

How to Enlist

Get application blank by writing to Chief of Ordnance, Enlisted Personnel Division, Washington, D. C. Fill it out, return to Chief of Ordnance, and if there is an opening for you at the time, authorization will be sent you to enlist at the nearest recruiting station, and if accepted there, free transportation will be provided to place of service.

"Armco" Iron Welding Materials



Square Rods, Coils or Straight, Round Rods and Wire for Oxy-Acetylene and Electric Arc Welding

The illustration shown above is one of the most striking examples of the practicability of welding. The cylinder was constructed for use in connection with a Diesel engine. Armco Iron welding rods joined the seams so perfectly that a tremendous hydrostatic pressure test of 3,000 lbs. to a square inch failed to reveal any weakness.

The outstanding qualities of "Armco" Iron welding rods are purity and ductility, so essential to successful welding.

Welding Quality was one of the five Special Characteristics for which "Armco" Iron was awarded the Grand Prize at the Panama-Pacific Exposition.

Growing demands are met with the prompt fulfillment of orders.
Write us for the names of satisfied users.

Carried in Stock.

Straight Lengths and Coils 3/8" 5/16" 1/4" 3/16" 1/8" 3/32" 1/16"
Squares 1/8" 5/32" 3/16"

Other sizes can be manufactured

Made by

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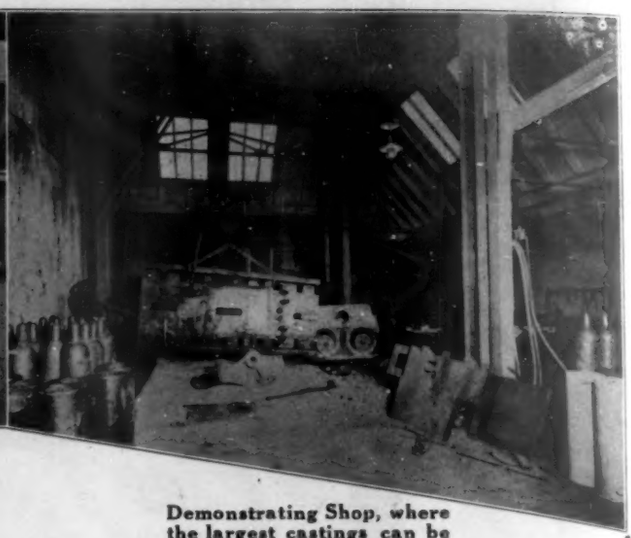
Another view of Demonstrating Shop, showing a multitude of small work



Demonstrating Shop, where the largest castings can be handled with ease.

Reasons Why Torchweld Torches Are Best

Torchweld Torches stay lighted, a feature both pleasing to the operator and a money saving factor to the employer.

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Torchweld Torches give a perfect gas mixture, both gases being under equal pressure. Imperfect mixture is the cause of constant trouble and worry to careful welders.

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Explains in a simple manner apparatus to be used, its care, and how to construct necessary shop equipment. Proceeds then to the actual welding of all automobile parts, in a manner understandable by everyone.

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Hold on! What were you doing just then? Storing away that interesting bit of welding experience, or a photograph, perhaps? Don't do it? Give it to us. We want to show it to 4,099 other readers of The Welding Engineer (you're the forty-one hundredth). If there are objectionable features to it, just leave it to the Editor (he studied surgery), cutting off and adding to is his hobby.

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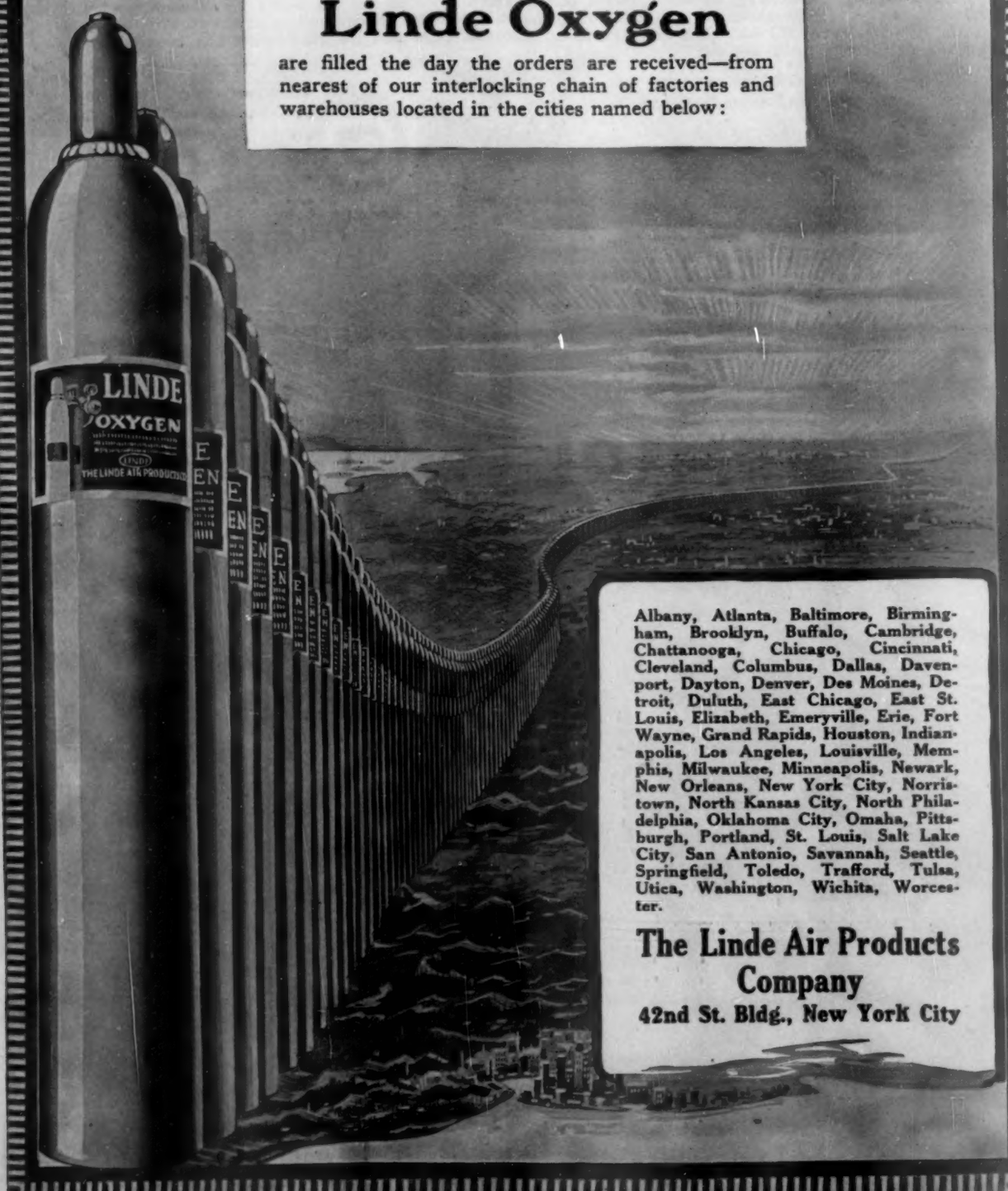

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OXY-ACETYLENE WELDING *of* COPPER, BRASSES *and* BRONZES—IV

By M. R. Amedo

Metallurgical Engineer to the Union de la Soudure Autogene. Translated, with additions, by D. Richardson, Wh. Exh., A.M.I. Mechanical Engineer, Member of the Union de la Soudure Autogene.

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The following is a summary of a series of tests made on copper welds produced in the one case with the correct welding rod and in the other with rods frequently used for welding copper. The loss of strength and ductility in the latter are very marked. The material welded varied in thickness from 5/8 inch to 1/8 inch and the welds were in each case hammered and annealed.

Applications

Lack of knowledge of the technique of the process and the difficulty in obtaining the correct welding rod have seriously retarded the development of the oxy-acetylene process as applied to copper. An extremely wide and varied field, both on the manufacturing and repairing side, is open to the process, and in the course of time an oxy-acetylene welding installation will form an indispensable part of the equipment of a copper smith's work shop.

Many firms have attempted to overcome the difficulty of welding rods by manufacturing rods for themselves, or have been led to make use of materials which give anything but satisfactory results. Attempts to manufacture rods often fail because, as already stated, the uniform manufacture of the correct rod can only be obtained after a long series of tests, and most firms have not the equipment for such tests.

No.	Thickness In Inches.	Tensile Strength Pounds Per Square Inch.	Elongation Per Cent.	Remarks.
1	5/8	29,870	22.0	Welded with Phosphoretted Copper.
2	5/8	32,000	19.5	Welded with Phosphoretted Copper.
3	5/8	28,450	19.0	Welded with Phosphoretted Copper.
4	5/8	33,400	20.0	Welded with Phosphoretted Copper.
5	5/8	33,700	22.0	Welded with Phosphoretted Copper.
6	1/8	32,700	20.0	Welded with Phosphoretted Copper.
7	1/8	29,870	25.0	Welded with Phosphoretted Copper.
8	1/8	27,700	21.0	Welded with Phosphoretted Copper.
9	1/8	33,000	23.0	Welded with Phosphoretted Copper.
10	1/8	27,000	17.0	Welded with Phosphoretted Copper.
11	5/8	22,750	11.0	Welded with Electrolytic Copper.
12	5/8	24,180	8.0	Welded with Electrolytic Copper.
13	5/8	15,650	4.0	Welded with Copper containing 3 per cent Tin.
14	5/8	12,800	5.0	Welded with Copper containing 3 per cent Tin.

The accompanying photographs will serve to show a few of the applications and the considerable progress made in the use of the blow pipe for copper welding. The two hot water cisterns shown in Fig. 15 were entirely constructed by oxy-acetylene welding from copper plates of 16 gauge and have to withstand a pressure of 70 to 80 pounds per square inch. The plates are rolled to form the body, the longitudinal seam is then welded, afterwards the dished and flanged ends are welded to the body.

The radiator for warming linen shown in Fig. 16 was constructed by the oxy-acetylene welding of copper tubes. The height is 3 feet 6 inches and width 3 feet. The main tubes are 3 inches in diameter and the branch tubes slightly less. The distance between the two rows of tubes is 3 inches.

The principal difficulty in the construction of the radiator is not in the actual welding operation, but in avoiding the distortion due to the successive expansion effects. These distortions are difficult to put right and consequently make the work costly. The method of operating so as to avoid distortion was to first weld the branch tubes to the main tubes commencing at the top. After cooling the same tubes were welded at their lower ends, the two welds in the lower angle of each frame being executed last. After the completion of each element, the uniting tubes at the top and bottom can be welded without any difficulty.

The copper vat shown in Fig. 17 is 3 feet in diameter and made from 3/8-inch plate. The welds, which were made by using two blow pipes side by side, were perfectly executed.

The construction of tubes and pipes from sheet copper, rolled, and welded by the blow pipe has proved of great value to coppersmiths. The use of the blow pipe has made possible the construction of tubes from very thin material which means considerable economy in weight and material when compared with the ordinary tubes. The construction of tubes of decreasing diameter and uniform thickness of material, used for certain types of internal combustion motors, are easily made by forming a conical tube from sheet copper and then welding the seam with the blow pipe. Such tubes can be bent to any desired shape which in itself is a serious test of the quality of the weld.

The pipe bends shown in Fig. 18 are constructed from rolled sheet copper and the welded seams are clearly seen. The welded pipes shown in Fig. 19 clearly show that the effects of expansion, which dishearten so many welders, are not insurmountable and that it is possible to weld seams over 12 feet long without meeting with serious difficulties.

Oxy-acetylene welding is rapidly replacing riveting and brazing in coppersmith's work. It should be mentioned, in passing, that the difficulties met by many welders in welding copper are often due to defective material. Copper plates are sometimes defective or contain impurities which entirely prevents the execution of a strong weld. Certain very pure copper plates made by the electrolytic process should not be welded. This variety of plate, which the welder should abso-

lutely avoid, are easily recognized by a simple examination of the surface, the metal shows, in this case, a series of channels which give the copper a dull aspect.

The Welding of Electrical Conductors

Oxy-acetylene welding may be used with advantage for obtaining strong joints between the various cables or omnibus bars in electrical power stations. *The operation of welding does not modify the resistance of the conductors if the joints are welded in a proper manner with the phosphoretted welding rod.*

A series of tests on copper electrical conductors, welded at many points for the purpose of the tests, showed that the welded material could be wiredrawn and possessed a conductivity higher than purest electrolytic copper.

The same results were obtained with a wire consisting of two pieces united together by the addition of a piece one inch in length.

With regard to repairs the oxy-acetylene process is often the only process that can be applied for the restoration of pieces broken, worn, defective, cracked, etc. One interesting application might be mentioned in conclusion and that is repairs to the tuyeres of blast furnaces. These very costly pieces become corroded at their extremities and the thickness of the metal thereby becomes considerably reduced. The use of the blow pipe enables a welder to build up the corroded parts, thus adding to the life of the tuyere at an exceedingly small cost. Oxy-acetylene welding has been proposed for the manufacture of these tuyeres as obviously blowpipe construction gives much tighter tuyeres than the cast ones. Attempts have been made to construct them from plates of mild steel, but the heat conductivity of steel is much too small.

Fig. 15.—Welded Copper Hot Water Cisterns.

OXY-ACETYLENE WELDING OF BRASSES

Physical and Chemical Properties

All alloys of which copper and zinc are the essential and chief constituents are called brasses. Alloys of zinc and copper are known in commerce by a variety of names. The alloys used for engineering purposes contain more than 55 per cent. of copper, and within this range there is a very great variation of properties. Commercial brass never consists entirely of copper and zinc, since whatever impurities exist in the separate metals will also be found in the alloy—the most common of these being lead, tin, iron, and arsenic. It often happens that some of these are purposely added, to produce a given effect in the alloys. Certain varieties of brass are exceedingly malleable and ductile. The malleability varies with the composition, with the temperature, and with the presence of foreign metals. Some varieties are only malleable when hot, others can be rolled at any temperature. Alloys containing up to 35 per cent zinc can be drawn into wire, but

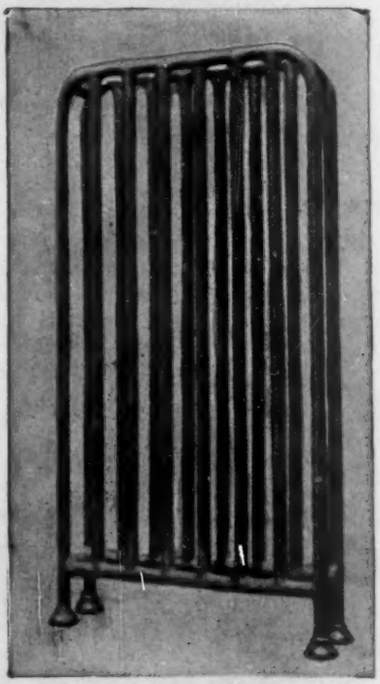


Fig. 16.—Linen-Warmer Constructed by Welding Copper Tubes.

those containing 15 to 30 per cent of zinc are the most ductile.

Brass is harder than copper, and therefore better adapted to resist wear and tear. It acts well under the process of stamping, provided it is suitably annealed at proper intervals. Crystallization is induced by work; hence the necessity for frequent annealing when the metal is worked cold. In annealing brass the temperature employed for annealing is of the greatest importance, for if the temperature is too low, the annealing is of no value; and if too high, the metal is spoilt, the effect produced being technically known as "burning." These effects will be dealt with later.

From a welding point of view brasses can be grouped into two distinct classes—namely, brasses containing 65 to 70 per cent of copper, which can only be worked cold; and brasses containing 55 to 65 per cent of copper, which can be worked hot. It is absolutely necessary to weld each variety of brass with a welding wire of the same character, and it is fairly easy, knowing the use to which the material is to be put, to find approximately its composition. A large number of varieties of brass are in use, and the following summary will serve as a guide to the composition:

Sheet Brass and Wire Brass.—For alloys of a full yellow color, the most suitable proportions are found between 66 to 73 per cent of copper and 34 to 27 per cent of zinc. For hot rolling, the alloys known as Muntz's metal, or, more commonly, yellow metal, are employed. They vary in composition from 56 to 63 per cent of copper and 42 to 37 per cent of zinc. The composition of brass for ordinary wire drawing varies from 67 to 72 per cent copper, and 33 to 28 per cent zinc. A little lead is sometimes added to brass intended for rolling to facilitate machining and filing the metal.

Cast Brass.—The composition of brass used for castings varies considerably. The composition most generally used consists of 66.6 per cent copper and 33.4 per cent zinc, which termed English standard brass. From 1 to 2 per cent of lead

is usually added to brass castings required for turning and filing. Cast brass is often more impure than rolled brass, a large quantity of scrap being generally melted with the new metal.

Delta-metal, Sterro-metal, and Aichs-metal are modern

Fig. 17.—Welded Copper Vat.

brass alloys containing a small quantity of iron, their composition brings them into the second class already mentioned.

Many brasses used in machinery contain a little tin, which hardens and strengthens the alloy.

The melting-point of brass is lower than that of copper, and falls steadily with decrease of the percentage of copper. A brass in the first class melts in the neighborhood of 1700 deg. F. (930 deg. C.), whilst a brass in the second class melts at about 1620 deg. F. (880 deg. C.). The heat conductivity of brass is less than that of copper, and molten brass is very fluid.

The colour of the alloys vary very much. A very small quantity of zinc destroys the red color of the copper. The color becomes brass-yellow, being strongest when the metals are present in about equal quantities then it becomes rapidly paler, and when the copper falls to 40 per cent it is almost silver-white, after which it becomes greyer, and approaches more nearly the color of zinc.

The tensile strength of brass gradually increases as the zinc increases from 0 to 35 per cent, then more rapidly up to about 45 per cent zinc, when it is at a maximum, then it rapidly decreases with more zinc. In a similar manner the elongation increases with the percentage of zinc, and reaches a maximum at about 30 per cent.

The Melting of Brass

The melting of brass by the blowpipe is accompanied by three distinct phenomena:

1. The absorption of gases.
2. The volatilization of the zinc.
4. Oxidation.

The Absorption of Gases

This is less intense than in the case of copper, and the composition of the flame has very little influence in the melting of brass. The diminution in the boiling effect—which has been mentioned by several writers—when a flame containing an evcess of acetylene is used is simply lue to the fact that the temperature in this case is lower than when using the normal flame. To obtain a tranquil melting with the normal flame it is only necessary to keep the white cone of the flame a short distance from the molten metal.

The use of an oxidizing flame gives, of course, an increased oxidation effect.

The Volatilization of the Zinc

The most striking phenomenon in the melting of brass by the blowpipe is the volatilization of the zinc. The vapors of zinc burn and are converted into the white fumes of the oxide on coming into contact with air. The white fumes are unpleasant to breathe, and are deposited on the surface of the work, on the blowpipe, and on the welder himself.

This volatilization of the zinc is not surprising, as the metal in fact, gives off abundant vapors some time before reaching its boiling point as 1725 deg. F. (940 deg. C). The melting point of a brass, say in the first class, being about 1700 deg. F. (930 deg. C.), and as this temperature is very near to the boiling temperature of the zinc, the zinc vapors are produced in large quantities.

In the case of a brass in the second class, which melt at a lower temperature, the volatilization of the zinc tends to be less intense, but as the percentage of zinc is higher, experience shows that the production of the white oxide fumes is practically the same with the two classes of alloys.

With regard to the brass containing 10 per cent of zinc, known as Tombac, which is sometimes used in error as a welding metal for welding copper, as the boiling point of the zinc is clearly passed there is produced, in spite of the small percentage of tin in the alloy, a large quantity of oxide fumes, and the metal is generally burnt during the welding operation.

Fig. 18.—Welded Copper Pipes.

This loss of zinc by volatilization varies considerably according to the thickness being welded and the experience of the workman handling the blowpipe. It may reach a fourth or fifth of the total quantity of zinc contained in the metal, and varies from one part of the joint to another.

It might be supposed that this loss of zinc could be com-

pensated for by making use of, as welding rods, alloys containing a low percentage of copper. For the reasons stated above this method does not produce the desired result. The most satisfactory method of avoiding modification of the metal due to the volatilization of the zinc is obviously to suppress it. This result is obtained by the addition of a very small quantity of aluminum to the metal to be used as a welding material. Aluminum, in fact, completely suppresses loss of zinc by volatilization; it also renders equally valuable service from the point of view of the deoxidation of the metal

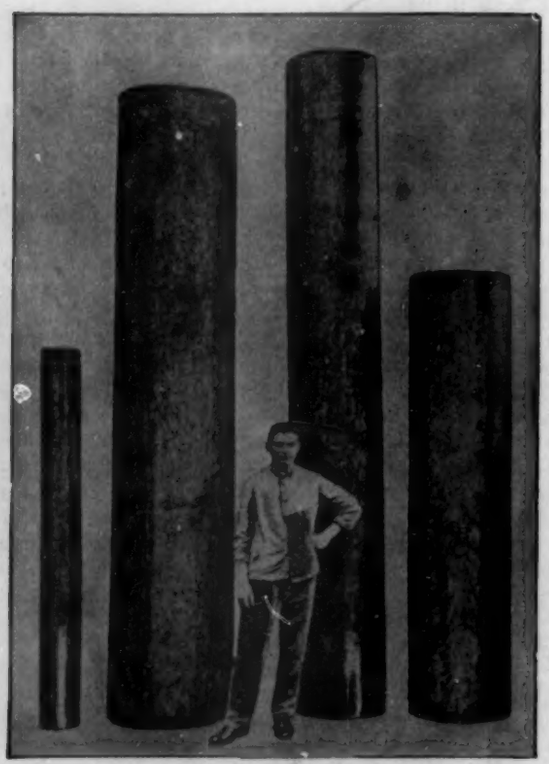


Fig. 19.—Welded Copper Welds.

Fig. 20.—Sheet Brass Welded with a Rod Containing Aluminum and 59 Per Cent. of Copper. (Magnified 250 Diameters.)

and prevents pinholes, which are the despair of welders working on brass, by suppressing the absorption of gases.

The Oxidation of Brass. The Deoxidation of the Metal

The loss of zinc from brass melted by the blowpipe is not solely due to its volatilization. Both the copper and the zinc in the alloy are oxidized under the influence of the air, but the copper oxide is reduced by the zinc, so that the loss of zinc by oxidation of the alloy is, in a sense, doubled—that is to say, oxidation of the zinc itself and oxidation of zinc at the expense of the oxygen in the copper oxide.

This oxidation robs the alloy of zinc and covers the molten brass with a light coating of oxide which leads to adhesion at the chamfered faces. Aluminum being a very energetic deoxidizer, prevents the oxidation of the zinc.* the alumina formed protects the metal from oxidation and the dissolution of gases. This film of alumina would prove troublesome in welding thick material, but the flux we have produced will dissolve it completely and form on the surface of the metal a protecting varnish.

If the oxidation of the metal is not very intense, the elimination of the aluminum may not be complete, but the presence of slight traces of aluminum in a weld is no serious disadvantage.

Welds obtained with welding wires corresponding to the first or second class brasses are very sound. The joining of the added metal with the edges of the weld is perfect. As an example, Fig. 20, shows a micrograph of the joint of a weld on sheet brass made with a welding wire containing 59 per cent of copper and traces of aluminum; in spite of the difference between the size of the crystals constituting the plate and the welding rod, the joint obtained is perfect. It is a true "intimate weld" of two metals, and it would be impossible to obtain such a weld by any other process.

(To be continued.)

*In the manufacture of brass the presence of small traces of aluminum serves to diminish the loss of zinc.

WELDING BY ELECTRICITY

In spot-welding the material is placed between copper die points supported on the ends of two arms, and the points are brought firmly together on the metal by the use of either foot or motive power. The current is then turned on. Copper being a good conductor, provides an easy path for the flow of the current, which, however, must pass through the metal to be welded to complete the circuit. This metal is a poor conductor, and in attempting to carry the large volume of current, becomes heated, and when heated to a sufficient degree, pressure is applied either by hand, foot or automatically, and the weld completed. The principle is shown diagrammatically in the accompany cut.

In case of automatic control, the current is turned on and off and the necessary welding pressure automatically applied by the controlling mechanism, driven preferably by a variable-speed motor. In this process the nicety of electric control is completely demonstrated. The current is applied to a certain definite spot only, and in just the quantity and for the length of time desired. On account of the intense heat and the rapidity with which it can be generated, several thousands welds per hour can be made in small, light stock, but the number for the heavier and more bulky stock is more limited on account of the time taken to adjust it in the machine and additional time necessary to complete the weld.

Butt-welding is very similar to spot-welding, except that the ends of the metal are brought in contact. This junction offering the greatest resistance to the path of the current, the abutting ends instantly begin to heat. The hotter the metal the greater the resistance becomes, with the result that the heat spreads to the adjacent parts until a uniform heat is obtained, at which time lateral pressure is applied and the weld completed.

Owing to the difference in cross-section of the metal at the junction in tee-welding, it is necessary to heat the larger piece to a bright red and then bring the other to the preheated larger piece and again turn on the current. Otherwise the piece of smaller cross-section would burn before the welding heat of the larger could be obtained.—Society for Electrical Development, Bulletin.

ACETYLENE ASSOCIATION MEETS

The annual convention of the International Acetylene Association was held at the Congress Hotel (Annex) in Chicago on Monday and Tuesday, October 29th and 30th, about one hundred members being present. On Wednesday, the 31st, most of the members visited the plant of the Underwriters laboratories, by special invitation. In the past the activities of this organization has been of more particular interest to manufacturers of welding apparatus rather than to the whole welding industry, but it has been decided that the work of the association is to be broadened and a very determined effort is to be made to enlist the aid and co-operation of all classes of welders. For this purpose a special committee has been appointed for the purpose of recommending to the association a suitable plan for not only soliciting the membership of welders, but for conducting more thorough researches into the art of welding as well. This plan perhaps will result in some such plan as is in operation in England being adopted. Messrs. H. S. Smith, Prest-O-Lite Co., and Henry Cave, Davis-Bournonville Co., are members of the committee.

President, H. S. Smith, Prest-O-Lite Co., Indianapolis, Indiana; Secretary-Treasurer, A. Cressy Morrison. Mr. R. R. Browning, Oxweld Acetylene Co., was elected a director.

COST OF WELDED HIGH-SPEED TOOLS

By A. D. Hallett

The accompanying figures, from costs taken on a lot of 300 welded tools recently made, readily indicate the advantages of tools with cheap steel shanks and welded high-

Cost of 300 Welded Tools

Labor:	
Saw	$ 2.00
Shape	3.00
Blacksmith	3.00
Pack harden	1.60
Oxy-acetylene weld	22.00
Rough grind	8.90
Gas harden	6.22
	$46.72
Material, 320 lb., new cold-rolled stock	22.40
Total	$69.12

WELDING SECTION—INTERNATIONAL ACETYLENE ASSOCIATION CONVENTION, CHICAGO, OCTOBER 29-30

Top Row, left to right, Nobel, Union Carbide; Schroeder, ImperialBrass; Smith (in corner), Prest-O-Lite; Earl, Davis Acetylene; Cave, Davis-Bournonville; Maurer, Davis-Bournonville; Miller, Rochester Welding Works; Hill, Great Lakes Welding Co.; Kopferschmidt, Michigan Central; Moore, Oxweld R. R. Service; Skinner, Kornitch and Sutton, Prest-O-Lite Co.; gentleman in corner not identified; Mackenzie, The Welding Engineer.

Middle Row (seated), left to right, Biglow, Natural Gas Journal; Rose, Oxweld Acetylene Co.; Noise, Imperial Brass; Morehead, Union Carbide; Jenkins, Alexander Milburn Co.; Shaw, Union Carbide; Davis, Davis-Bournonville Co.; Browning, Oxweld Acetylene Co; Nyquest-Torchweld Equipment Co.

Bottom Row (seated on floor), White, Union Carbide; Haila, U. S. Gauge Co.; Hume, Journal of Acetylene Welding; Pettis, Imperial Brass Mfg. Co. (Not all of the members in attendance were on hand at time picture was taken.)

Committee reports for the year were unusually interesting. Mr. J. M. Morehead, chairman of the Technical and Engineering Committee, read an interesting report on the development of the welding industry. Several resolutions were adopted, one of them pledging the support of the association to President Wilson. The convention terminated Tuesday evening with a banquet in the Florentine Room, which, with a theatre party on Monday evening, constituted the entertainment for the men.

The ladies were provided with entertainment in the form of dinner and theatre parties. The committee in charge of entertainment, of which Mr. R. A. Shaw is chairman, did a very thorough job and are to be congratulated by the association. Officers elected for next year are: President, J. T. Earl, Davis Acetylene Company, Elkhart, Indiana; Vice-

speed steel cutting tips taken from the scrap box. At a total first cost of less than 24c., a tool was made that replaced the customary $4 one in use in most shops.—American Machinist.

Electric spot welding machines are being used extensively by the Studebaker Corporation, Detroit, in making various elements for its automobiles. Difficult machining operations are either avoided or simplified. The time required for making parts is reduced and the finished product proves strong in service.

Empty carbide cans make excellent rubbish receptacles. The top should be removed carefully, after which they should be painted, the word "Rubbish" being painted on them. Other uses may suggest themselves.

Hints for the Welder

When you finish an interesting piece of work, can you set down on paper the manner in which you went about the job, how you prepared the work and how the job was done? Have you learned some little stunt every welder ought to know? Contributions to this department are paid for. Write it down any old way—I'll polish it up. Make a rough pencil sketch and our draughtsman will fix it up fine. Line drawings are more practical than photographs. Do it today—the men on the firing line are waiting.

L. B. Mackenzie, Editor.

BOILER WELDING.

Editor: I am a welder employed in the P. C. C. & St. L. R. R. of this city (Terre Haute), and I have done all of their boiler welding for the past two years. Having read some good articles by my brother welders, I wish to contribute what I believe will be of benefit to boilermaker welders everywhere. I do not know whether the method I use is in universal practice for welding long seams in fire-boxes, but it is one I find very satisfactory. In applying side sheets to fire boxes both edges are beveled to 43 degrees. The new sheet is riveted up solid and all stay-bolts applied but one row next to weld on top and bottom. We put strip of boiler plate about 4x4 in the water space edgeways before bolting up new sheet.

This is done so that by putting in ¾-inch bolts and tightening up nuts on outside, new sheet is pulled down even with the old and against the strip which is edgeways beneath. I always allow ¼-inch space for the reason that when you start to weld, both edges in getting hot, expand about ⅛ of an inch each, and this leaves you ⅛-inch opening; then you apply metal which is about right to allow metal to penetrate thoroughly to the other side. Now, right here, is the very best part of method I employ, and I believe has many other tacking methods beaten a mile. I start my method at what would be called the wrong end and weld about four inches. Then I begin again about 12 inches ahead of my weld and weld back to where I left off, and when finished I do the same thing over and so on until weld is completed.

Care should be taken to thoroughly weld where the end of your tacks meet. By this method you can start and stop almost any time you wish and your weld suffers no bad effects.

I always make an angle of my filling rod so as to have it pointing toward my weld at all times by simply putting through stay-bolt holes and bending it, which takes only a few seconds.

I also believe welding flame should point in direction weld is progressing, and should follow a circular movement away from welder.

A handy tool which is sometimes useful is a pry-bar made of ¾ steel with a chisel edge on both ends and one end bent to 45 degrees. This is to use when your edges do not meet evenly by prying bottom sheet in or out as it may need it.

By this method I have welded many sheets in our fire-boxes without a single crack when they cool off. I weld ½ boiler steel at the rate of 2½ feet per hour by this method, and some of our welds have been in service 18 months and are holding out O.K.

In welding fire-box patches I prefer a triangular patch with rounded corners. By making them this shape the welds do not contract against one another as much as when the welds are parallel. In welding them I make one weld, then let cool off before making weld on another side. While weld is cooling I am usually welding defective spots on outside or making weld on other patch on the other side of the box.

C. S. Thomas.

WELDING FLUES.

Editor: We note inquiry regarding welding of 12 inches to end of flues. We have a similar job and would like to know how acetylene welding compares with forge work on this. It would come considerably cheaper if we can weld these with the torch. S. A. Fdry. & Mach. Co.

Answer: The practice of welding new ends on flues with oxyacetylene system is good if performed by an experienced operator, one who is familiar with boiler construction work. The edges should be bevelled to a 45-degree angle and welded with a ⅛-inch Norway iron rod. The welding line should then be handled by placing a heavy, round tool inside of the flue directly under the weld, the weld being hammered slightly, while at a bright red.—Editor.

BOILER WORK.

Editor: I am asking if I can get some instructions for welding stay-bolts in a steam boiler where the bolts come through in the fire-box. The Goodale M. S. Co.

Answer: The proper method of applying stay-bolts on a steam boiler is to use threads. If more than three bolts are to be handled, they should be threaded and screwed and riveted on the ends, care being taken to drill on the center of the telltale holes about ¾ of an inch deep. However, if only one or two bolts have been damaged, and no bolts can be procured readily, these ends can be welded to the sheet, provided the telltale holes are not obstructed with metal.—Editor.

BRAZING STEEL.

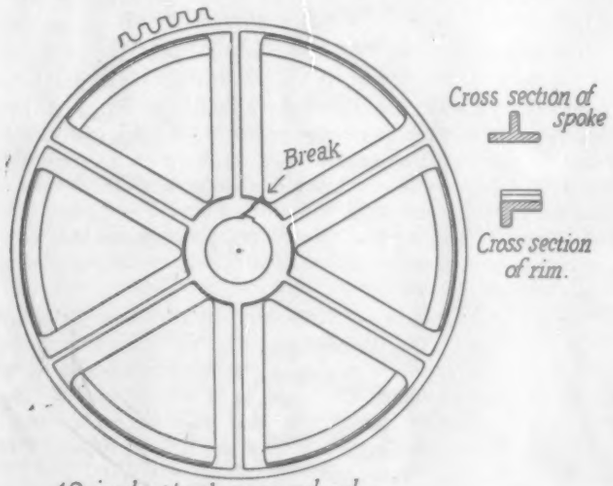
Editor: I wish you would please give me a little information through the columns of The Welding Engineer on brazing steel pieces. I have tried to braze steel pieces together, but I have been unable to get the brazing material to stick solid to the steel parts. I have used common brass rod and tobin bronze rod, and have used borax and two different kinds of flux, but after it gets cold I can take a hammer and chisel and get underneath the brazing and knock it all off. I cannot get it to adhere firmly to the steel. I use an oxy-acetylene welding torch and get the pieces a bright red. If you can tell me where my trouble is I will appreciate it very much. F. W. B.

Answer: Your trouble lies in the fact that you did not clean the edges off properly or the borax was not applied at

the right temperature. For successful brazing follow these instructions: Clean to a brightness the parts to be brazed with a file, emery cloth or sandpaper. Then heat one piece of steel at a time at the bright edge, and about one inch long to a bright cherry red. At this temperature sprinkle a little powdered borax all around the heated edge. Then heat a little more to a bright red and apply tobin bronze rod on the steel and you will notice that the molten brass will voluntarily run all around the heated portion and the steel edge will appear as brass plated. Follow the same method with the other piece of steel, and when both edges are brass plated, set them in the right position, heat both edges to a dull cherry red, sprinkle a little more borax and apply tobin bronze on the edges, and the solid adhesion is obtained simply by slow cooling.—Editor.

A GEAR WHEEL.

Editor: Am sending $2.00 for another year's subscription of *The Welding Engineer*. Am also sending sketch of a 48-in. steel gear which I had trouble in welding here some time ago. My manager used to do his own welding and cutting before I



48 inch steel gear wheel.

came here and he told me how to weld this gear, but it was not a success. I think I could have done the job by myself, but such was not the case. If you will give me your advice on how to preheat and weld this gear, it will be highly appreciated.

Benj. Anderson.

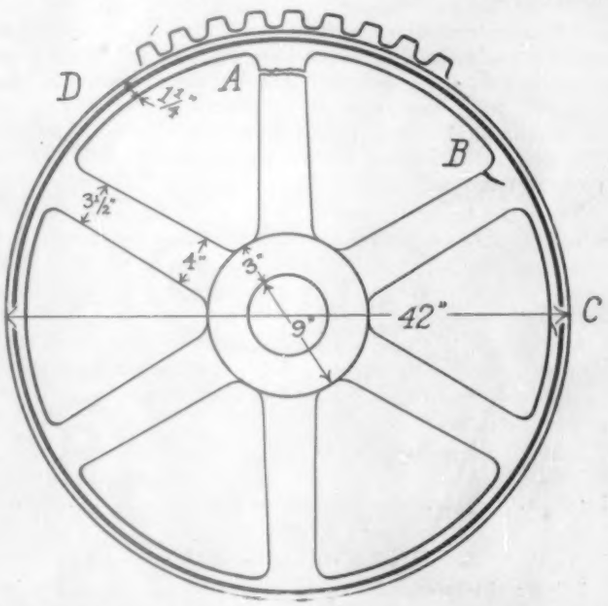
Answer: Preheat rim at points each side of broken spoke until crack opens up to point where hacksaw blade can be inserted. When welding is started take cover off rim, trying to keep rim at deep blue temperature until weld is completed. When finished allow job to cool slowly. Editor.

A GEAR WHEEL.

Editor: Enclosed you will find a pencil sketch of a large gear wheel which I welded some time ago. The wheel was new, and the machinist upon investigating found that the spoke at "A" was partly cracked. Upon using a pneumatic chipper the spoke cracked with a bang and the rim separated from the spoke about ¼ in., partly cracking the spoke at "B," this showing that there was a strain on the casting when cast. The gear as it now is is out of round at spoke "A." In welding I built a brick furnace from "C" to "D," and heated to a red heat with charcoal, covered with asbestos until next morning. Was this the proper procedure? Upon preheating the rim opened at spoke "A" about ⅛ in. more. Now I claim that the untrue shape of the gear is no fault of the welding operation, while the superintendent thinks it is. I would like your opinion on the case. I have been welding and cutting for the past eleven months, so am practically a beginner. Your advice will be thoroughly appreciated. Would also like to know if cast iron filler and cast iron flux are used in welding a cast iron flange to a wrought iron pipe. Will you kindly answer at your earliest convenience?

Al Snyder.

Answer: Beyond a doubt there was a strain on this wheel when it was cast, and upon chipping the spoke it naturally gave way and took nearly a natural position. Had you taken measurements before chipping no doubt you would have found that



the wheel was flat on this side. Many welders have a tendency to preheat too much in handling jobs of this kind. In one large, successful shop we know of, in cases similar to this, the rim is simply brought to a deep blue color, the asbestos cover is removed, the rim being allowed to retain this color during the operation. The weld is then completed and the wheel allowed to cool in a natural way. You perhaps preheated to the extent that the crack opened up so wide that the filler you used formed a wedge, preventing the rim returning to its normal position. The spoke should be preheated to the point where a hack-saw blade can be inserted in the crack. Many welders will disagree with me on this point, but my answer is that the system is being followed by some very experienced welders with complete success. Many welders also make a practice of cutting spokes on each side of fractured spoke, which has a tendency to equalize the strain and bring the wheel back to a true round.

Relative to welding a cast iron flange to wrought iron pipe, at the start I would say that this is very bad construction. The joint will be no stronger than the casting, so why use a better grade of pipe? If the job must be done, use your ordinary cast iron flux. Editor.

WE WANT THEM.

Editor: In a rather general line of reading, I am struck with the diverse kind of publications mentioning the oxy-acetylene process and the frequency with which such mentions occur.

In the past week, for instance, *The Saturday Evening Post,* in one of its stories, captions an illustration: "George Little Ate His Way Through Obstacles Like an Acetylene Flame."

In the August 30 issue of the *Pacific Homestead,* a western farm paper, under "Old Iron Junk," a story is printed about California Indians making a killing by selling scrap machinery of one kind or another to junk men.

The *Blacksmith and Wheelwright,* in its August issue, has a good story, designed to wake up the old-fashioned blacksmith, under the caption "Welding Profits."

The New York *Tribune* recently told how a fireman in an eastern plant entered a boiler to chip out scale only to find that

he could not get out when the time came. Nothing helped till a blowpipe arrived on the scene, wlhen he was released in jig time.

Not a single one of these stories was illustrated—in all probability because no pictures were taken, for an oxy-acetylene photograph is usually a sensational looking proposition and enough out of the ordinary so that it has "news interest." Many repair jobs are of sufficient public interest so that photographs would be gladly printed.

The only "real illustration" I have seen in recent months appears in paid space in the Watertown (N. Y.) *Daily Times*. Quite evidently, the Geo. A. Lance Foundry & Machine Co., of that city, know how to put over a difficult job and how to cash in on it once it is done. They deserve a rich harvest of business for their enterprise and doubtless they received (and are still receiving) it.

The point is: where are the pictures of the unique, the important jobs other welders are doing? If they haven't got them, they're missing a pay streak of good advertising—often free advertising—that would surely bring business to the job welder or build confidence in the skill of individuals.

Incidentally, if I may suggest, I should say that the publication of a few good pictures in each issue of your paper should be a splendid circulation feature and would bring out some very interesting jobs. R. D. M.

Note: Such photographs as are mentioned are wanted by *The Welding Engineer*. We ask our readers to co-operate in securing them. Suggestions will be appreciated. Editor.

NICKEL STEEL RODS

Editor: In reference to your advice on page 34 in the last issue, to use nickel steel welding rod for welding high speed tool tips to machine steel body. Kindly tell us of some maker selling this steel welding rod. Your answer seems to be very good and am anxious to follow your instructions. F. Valtier.

Answer: Nickel steel welding rods can be obtained from all of the principal advertisers of torches in *The Welding Engineer*. Practically all of these manufacturers carry these rods in stock. Editor.

GENERATORS

Editor: The article written by Mr. W. A. Bennett in regard to the use of acetylene generators, indeed, should be very interesting to all welders.

We sincerely believe that all manufacturers of generators should be very explicit and give users every precaution of the use of acetylene generators, and while there is positively no danger when they have a high grade generator which is substantially built and equipped with all of the latest safety devices, but it is positively unnecessary to use more than 15 lbs. pressure upon any generator, as this is the maximum specified by the Board of Underwriters, and can be vouched for every time as being correct.

All good generators are equipped with the latest automatic safety devices which will blow off at excessive pressure of 15 lbs.

We do not hesitate to state that if the party who is using the generator which Mr Bennet speaks of in his letter, intends to raise his pressure from 75 to 80 lbs., we do not believe there is very much chance for him to live to tell of his experience.—C. E. Freeman, Superior Oxy-acetylene Machine Co.

WANTS AN ASSOCIATION.

Editor:

Having read Mr. Kopferschmidt's article will say I agree with him to the point of forming an acetylene welder's association but not only in one state, but a nation wide sweep for protection of competent welders and helpers. Making their title complete (The American Acetylene Welders Association). I, for one, am in favor of forming an association for welders to handle all welding in all departments, especially on railroads where the different crafts employ a welder or would be welder, such as boiler-makers, machinists and blacksmiths. I know of one welder being turned down on a 52 cent job because he was not a blacksmith welder, but was a general welder, and he was hard to beat welding engine frames and heavy casting, but the organized crafts on that particular road wanted a man for that department and when not welding, to do forging, etc. I think gas welding should be classed by itself and when the work got too much for one welder, employ another and divide the work according to the operator's ability.

H. L. Blackwood.

PROPER RODS

Editor: Will you kindly advise us the best material to use in filling in a shaft hole in gear or pulley wheel for the purpose of filling up a broken shoulder on the side? We wish to avoid the necessity of re-boring the hole after filling up.

Any information you can offer will be appreciated.

C. C. Fouts Tank & Silo Co.

Answer: We do not understand your inquiry of Oct. 31st, regarding the welding of gear or pulley wheel. We presume the metal is cast iron, though, as you know, all gear or pulley wheels are not of this metal, but sometimes of steel. Assuming that the metal is cast iron, you will of course use for a filler rod a special grade of cast iron, which you can purchase from any of the apparatus companies. This rod is simply specified as a cast iron welding rod.

You say you "wish to avoid the necessity of reboring the hole after filling up." This is very vague to us. If you mean by this that you do not want to do any machine work but still have a hole through which the shaft will go, it will be necessary for you to use a rod of carbon, the same diameter as the shaft. This rod you can also purchase from any of the apparatus or supply companies.

If this does not give you the information you want, send us sketch of your proposed work, together with full explanation and we will be glad to advise you further. Editor.

MAKING A WELDER

Editor: I am seriously thinking of taking a course in welding. Will you please give me some advice? My age is 28, am married and have three children. Have had eight years practical experience in the carbide business. Am at present in the efficiency department of an automobile factory. The foreman of the welding department is trying to interest me in taking a course. He is also an instructor for a welding school. This school claims that by taking twenty-four lessons I can become a welder.

W. B. R.

Answer: I do not believe that a welder can be made in twenty-four lessons. Of course, I know nothing about the character of the instruction given at the school you mention, but no matter how thorough the instructions are, I doubt if desired results can be secured. Of course, it would be possible to teach a man the rudiments, care of apparatus, etc. If he then had an opportunity to practice and familiarize himself with the work, he would undoubtedly become a welder in time. Perhaps you are so situated that you could carry on this work, in connection with your present duties, and thus make a success of it.

A great many of the so-called welding schools are turning out students who can pass muster on a job of welding sheet steel, for instance, but very few of them are qualified to be rated as a welder. Editor.

A MASTER WELDER'S RECORD.

Editor: We are very much interested in the article "Master Welder's Record," which appeared in the March, 1917, issue of *The Welding Engineer*.

From experience I know that it takes a great deal of time to keep cost records on any kind of work in railroad or commercial organizations and especially in shops where they do not have a regular time-keeping system which includes individual operations of workmen.

There is one question which I would like to ask Mr. Kopperschmidt in regard to the figures shown in table figure 8. The cost per burner hour for eight months from January to August averages $2.17 for welding, and the cost per burner hour for cutting work averages $2.35 for the same period. My experience is that the cost of doing cutting work includes about three times as much oxygen as welding. Therefore, the cost per burner hour for cutting work is naturally a little more than twice that of welding. Our understanding of this unit cost per burner hour is the cost of operating the welding or cutting torch per hour, including cost of the gases, welding rod, supplies and the labor of the operator.

We shall be very glad to have Mr. Kopperschmidt answer this question and feel he may have some other method of computing the cost of this work with which we are not familiar.

R. T. Peabody, Welding Engineer,
Railway Service Air Reduction Sales Co.

Answer: This question the author of the article answers as follows:

"In regard to the questions asked by Mr. Peabody, I would state that our welder or cutter unit cost per hour is the cost of the gases, labor of the operator, welding rod and fluxes, fire bricks, asbestos, carbonized block and fire clay.

"I agree with Mr. Peabody that it requires two or three times as much oxygen for continuous cutting as it would for welding per hour, but while our welders are losing very little time in ten hours, the cutters are only doing actually about five hours' work of cutting in ten hours. This is due to the portable nature of their work. While the welder may have a single job that will take him ten or more hours, the cutter, like a peddler, pushes his cart from one job to another and performs perhaps five minutes' cutting on each engine and loses five or ten minutes before he reaches the next job. Thus in this intermediate time no gas is consumed, but the time is figured the same as if he would have continuous work. Another item that reduces the cost of cutting per hour is the difference in rate from a cutter to a welder. Our cutter's hourly rate is 25c, and our welder's hourly rate is from 32c to 40c. Furthermore, the cost of welding per hour is considerably increased after we add to the cost of labor and gases, the cost of welding rods, fluxes, fire brick, fire clay, asbestos and carbonized blocks, which are not necessary with the cutting operation. Thus the loss of time, difference in rate and material, equalizes the cost of both units, bringing the cutting unit cost per hour about 10 per cent higher than that of welding. B. K.

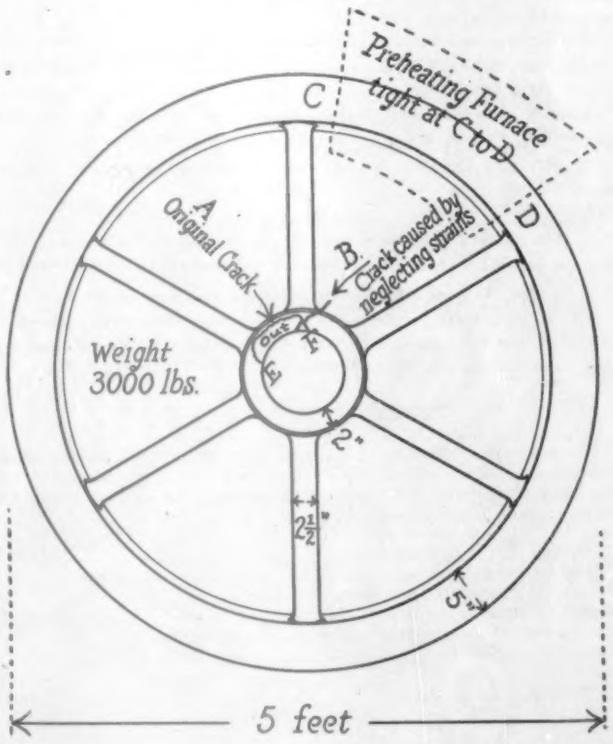
WELDING A LARGE CASTING.

Editor: I welded a large water front about seven feet square. That is to say, it was seven feet long, seven feet wide and about eight inches thick. It was coarse, not solid, and was very thin in the center and heavy, solid cast around the edge. The whole casting varied all over from ¼ inch up to 2 inches. The rim was about 3 or 3½ inches thick. The job had been attempted by a few amateurs before it was brought to me.

I built a brick oven and heated it good and hot and welded it up and when it cooled it cracked, owing to the variation in thickness of metal. I tried it again with like results, the crack being in a different place, within two or three inches of the weld. I then cut a strip out of the casting, where the cracking occurred, the strip being 18 inches long and about 12 inches wide. I took a piece of thin sheet iron and dished it and laid another sheet on it and welded it up without trouble. C. S. Johnston.

A FLY WHEEL JOB

Editor: This job had to be done quick, for a whole plant was out of service. The job came in at five thirty in the evening and the plant had to have the fly wheel in order to run the next day. The job looked hard, both because of its size and also because of the location of the break. I ground out the small piece that was broken off the hub, from E to F. I had an idea I could weld it without taking the strains off of the rim. I finished about eight thirty and made a pretty job of it. I washed up, after staying with the wheel until I thought it was safe. Shortly after I arrived home they called me up and said the hub had broken from one end of the keyway to the other. If I had taken the



strain off this would not have happened. I went back to the shop and started the job over. I built a furnace from C to D and I kept the heat off the spokes while I was heating the broken hub across the V shaped keyway with my torch and I had my preheater heating the rim from C to D. After I got the hub red hot I melted the metal out and after it was all out, except about an eighth of an inch, I started to weld. After I was nearly through I cut off my preheater and the rim was just red. I finished welding and covered hub up and left rim open. I finished the job in three hours, and after it was cool I took a sledge hammer and rapped it two or three times pretty hard on the hub, and the weld held. It is now in service.

A. C. Carlisle.

WELDING SHEET IRON TUBE.

Editor: We are making a machine that requires a sheet iron tube 11 feet long and about 5 feet diameter. Some are made of ¼-inch stock and others of 5/16-inch stock.

There is no pressure on these when in operation and are now being riveted. They have to be perfectly round so as to fit in a cast iron ring.

Kindly advise if, in your judgment, these could be welded with a saving to the company and if so, your method of doing same.

Do you know of any concerns that are doing sheet metal

(Continued on page 29.)

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Copies to prospective advertisers	75
Copies to other trade papers, correspondents, etc	60
Copies mailed as samples to prospective subscribers	762
Copies for office use	10
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VOLUME 2. NOVEMBER, 1917 NUMBER 11

The 1917 Convention

WE have often heard it said that the International Acetylene Association was not of particular interest to welders because the most of the activities of the association were along lighting lines. The complaint has been made that the subject of welding received but scant attention.

At the convention which was held in Chicago the last of October, this problem was discussed and it was decided to go more thoroughly into the subject in the future. Acting on this impulse, a committee has been appointed for the purpose of investigating the situation, and recommending the proper course of action for the association. It is thought that a new class of membership will be created for welders, and it is believed that in the future the deliberations of the association will be separated, thus giving the subject of welding the recognition its growing importance would seem to warrant.

The older members of the association feel that the time has come when young blood is needed around the council fire and it is their purpose to outline a plan which will be both attractive and beneficial to all welders. A further announcement will be made after the special committee has reported and the association has acted.

The Electrical Bogy Man

WE frequently meet men who are exponents of the oxy-acetylene system of welding and who are overcome by their fear of competition by the arc-welding folks. Of course, the electric people are making progress, and quite frequently they change an oxy-acetylene operator into an electric-arc operator. There is a very decided place for the arc equipment, as we all know, and when one of the bright young arc-welding salesmen catch up to the prospect the sale is made.

Assuming that the inroads on the gas field are going to continue, and even increase, oxy-acetylene salesmen are foolish to worry. They have so many prospects, so many opportunities to increase the number of oxy-acetylene users, that it will be many years before competition is seriously felt.

Oxy-acetylene people have more to fear from the manufacturers of cheap and unsafe oxy-acetylene apparatus. He is the fellow to watch and if possible put out of business.

Testing Welds

THE superintendent of a welding shop of which we know requires his operators to weld a test piece of tank steel ½"x2" every Saturday afternoon. The pieces are tested on Monday and the results announced. The men stamp their own test pieces with a number and the superintendent knows the specimens by number only. After the tests the men identify their numbers. This superintendent believes this method helps to keep his men "on their toes."

What Is a Diplomat?

WE hear that a diplomat is one who throws away his cigarette before he monkeys with a generator. He slows up when he turns a corner and speaks cordially to a strange dog. He expects every welder to claim that he has been a welder for ten years and he always makes allowances for conceit, arrogance and reserve. Lastly, he removes his hat when the colors pass and reads every issue of The Welding Engineer.

Don't Be Afraid of the Sidelines

A FEW years ago a young man changed from one college to another and, in accordance with the "one year rule," was obliged to remain on the side lines for the first season of football, although an excellent player. When asked if he did not regret losing a full season of playing he replied: "No, I learned more from the side lines here in one season than I would have learned back there as a varsity player."

A young man who is ambitious to land in the foremost class can well afford to spend some time in a minor position. He can afford to spend some money for a course of instruction in a good welding school, or he can afford to work as a helper to a good welder. The benefit of expert coaching is often more valuable than the experience gained by playing an important part with a bunch of second raters. Don't be afraid of the side lines. It is a mighty fine place for the fellow who keeps his eyes and ears open.

Welders as Salesmen

WE wonder how many proprietors of job welding shops appreciate the fact that salesmenship plays an important part in the successful conduct of their business. Your bearing and the attitude you adopt in your dealings with your customers has not a little to do with success or failure. The man who is there with a smile and a soft voice enjoys a natural advantage.

Taking a Day Off

WE think a man's ability to leave his business for a time and have everything run smoothly during his absence is the best test of his control over it. The good organizer, unless he is limited to very poor material is the man who makes his own presence less and less of a necessity to the smooth operation of the business.

HINTS FOR THE WELDER.

(Continued from page 27.)

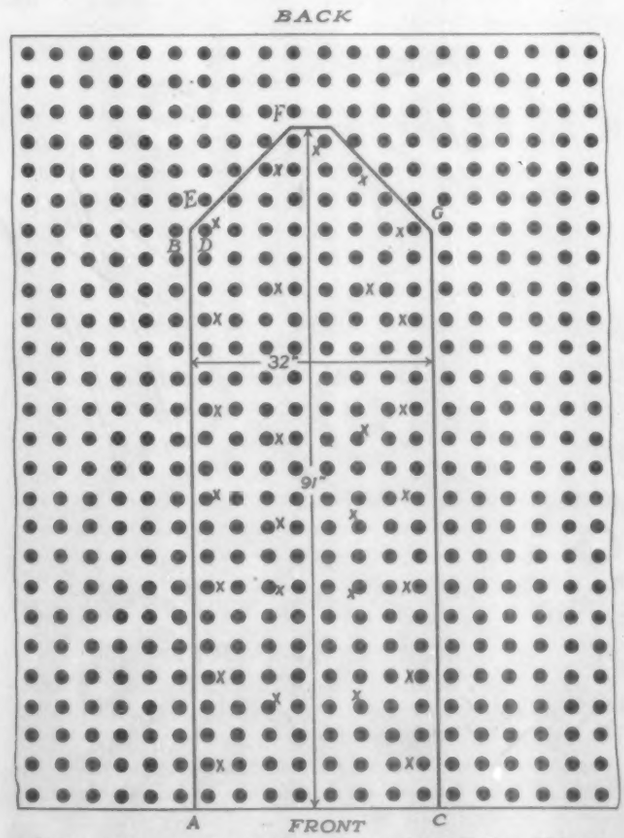
welding to any great extent that I could visit if arrangements could be made? H. B. Dominy.

Answer: The welding of the sheet metal tubes instead of riveting is very practical, efficient and economical. The proper method of welding these tubes is to separate one end before commencing to weld, about 5 per cent of the length to be welded. After the close end is welded the separation is obtained by means of a couple of wedges of appropriate size, placed about two-thirds along the line of welding. As soon as the weld is commenced, the wedge is gradually raised so that the edges can approach as the work proceeds.

Any metal barrel welding company should demonstrate this class of work satisfactorily. Editor.

CROWNSHEET WELDING

Editor: I am sending you a chart of a job I have successfully welded, single handed. It was quite a tiresome piece of work, being all overhead work, but it saved the fire box. The old crown sheet was checked and water pitted until it was no longer serviceable. The foreman asked me what I would do to make the least welding and least work for the boiler maker. You see the way I cut it out and welded it. I had one row of radials taken out around the entire patch. I then gave the patch ¾ in. more roll than the required radius. I clamped it every 15 in. around entire crack. In addition I used ⅞-in. bolts with jam



HEAVY LINES SHOW WHERE PATCH WAS WELDED IN CROWN-SHEET WITH OX-WELD

nuts at all holes marked with an "X." From A to C it was bolted to the flue sheet. I then started welding at A and welded to B, using wedges to help overcome the expansion. By the time I reached B the line from E to F was a perfect crack and my helper had loosened the jam nuts and allowed the radius to drop as it cooled. I then started at C and welded to B, operating the bolts so as to hold the sheet at the right radius. I welded the entire job, averaging 20 in. per hour. This may be an interesting job to some railroad men. The engine is giving good service as far as the patch is concerned.

C. R. Woleoslagle.

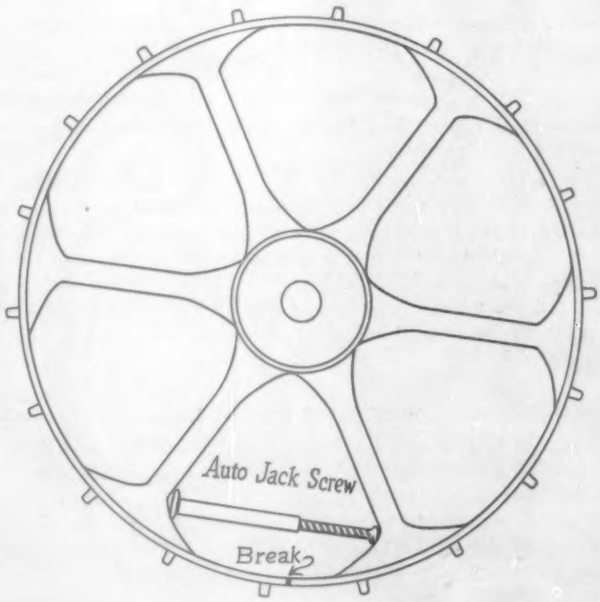
THE EXPANSION PROBLEM.

Editor: You have published many times the way to overcome expansion and contraction by heating the piece to be welded, or heating in some certain place to gain the same results.

On many pieces heating is the only way to allow for contraction, but there are some pieces on which a different method can be used which will save time, hard work and money.

To illustrate, I give a drawing of a mower wheel which is cracked in the rim.

Place a screw jack as shown and force crack open three-sixteenths of an inch or more, depending on size of wheel. Set wheel on blacksmith forge with crack over fire. You will no-



tice as heat comes to a red that crack will just close up. Of course crack must be opened up to a 45 degree angle, just leaving thin edge of original crack to go by, before starting to heat. When iron gets to a red heat, weld, and when through welding remove the jack screw and take from forge fire, let cool slowly.

It will then be as sound and strong as ever; in fact if extra metal is put on weld it will be stronger at weld than along the rest of the rim.

This method can be used on gear wheels, frames, and any place a screw jack can be used to spread break open enough to allow for contraction. C. S. Miller,

Miller Welding Works, Creighton, Neb.

HARDENING CAST IRON.

Editor: Can you tell me how to harden cast iron? I have some chilled cams to build points on and I must grind them after building them up, and my iron is too soft.

H. A. Zimmerman.

Answer: For a filler rod use old cast iron piston rings and adjust for a carbonizing flame, or in other words use an excess of acetylene. This will incorporate more carbon into the weld and produce a hard metal similar to white iron. Use the same flux as usual. Editor.

WELDING A WHEEL

Editor: I have a job upon which I would like your opinion. It is a Rumley 15-30 tractor (oil pull) fly wheel, 4 ft. 8 in. diameter, 4-in. face, 5-in. depth, square hub 8x7 in. It is broken at keyway clear across hub and part way up one spoke. The hub is open on each side, as per sketch, and clamped to shaft with four bolts. Would it be necessary to preheat the rim or any part of the wheel to overcome expansion and contraction? The wheel weighs about 1,200 pounds.

A. J. Loeb.

Answer: If I understand properly the wheel is cast in two parts and bolted to the shaft. If so, your operation in welding the hub is comparatively easy if you use the following method:

Separate the defected half wheel and chip the fractured hub as per attached sketch, taking care that the bevel should be at least in a 45 degree form. Then lay the half wheel flat on brick platform, taking care that the wheel is well rested all around on fire clay, that is laid previously on top of the brick platform. Then build a brick furnace around wheel about 3 in. higher than the wheel, and allowing an 8-in. fuel displacement. On this position it will appear that you will have to make a vertical weld, but in reality you will make a horizontal weld if you will prepare five carbon blocks 6x3x1 in. The idea is after the wheel is properly preheated, place one carbon flat and close to the bevel to form a sort of dam and fill this space until the height of the carbon (1 in.) is reached, then place the next carbon and so on until the top is reached.

To preheat the wheel fill the whole furnace with charcoal and after it is kindled let it heat until cherry red. Then open the sheet asbestos cover enough to be able to reach the fracture and when the welding is finished as outlined, cover the top with sheet asbestos, close every hole and crevice of the furnace with fire clay, and leave it that way to cool slowly. Do not remove wheel from the furnace until it is cool enough so you could lay your hands on it.

Editor.

WELDING SHEETS.

Editor: Will you please advise us how to lay out sheets ¼x7x10 ft. for welding? We are welding three of these sheets on the 10-ft. side to make up a steel tank. We desire to know the proper distance in layout, to leave the plates at the finishing end of the weld. If you have any information regarding same, we would be very glad to receive it.

F. R. Patch Mfg. Co.

Answer: To weld sheets of the character mentioned in your letter, we advise you to bevel the edges to a 45 degree angle, and then separate the edges 1 in., as shown in the attached sketch. Start the welding operation at the close end, and continue without stopping until the extreme end is reached. At the end of the operation the two edges should meet exactly without overlapping.

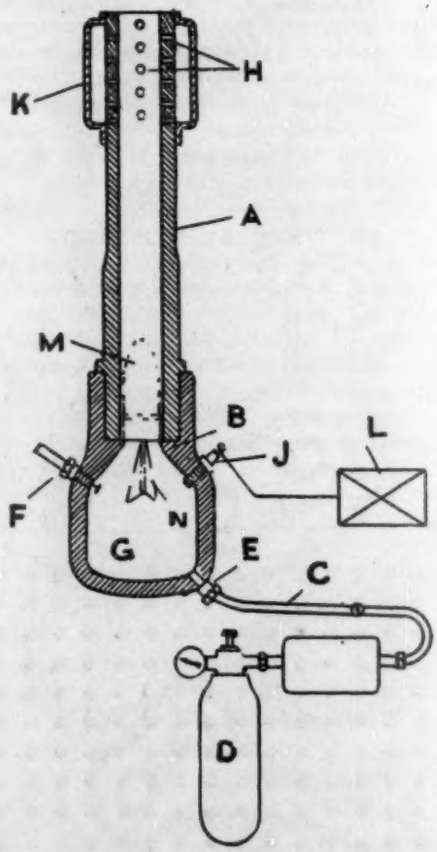
It is of course, extremely difficult to advise the distance which should be allowed in separating sheets of this character. As you know the heat radiation and the charatcer of the material being welded is apt to make a slight difference If you have a considerable quantity of this work, however, your welder should be able to determine a method of separating the sheets which would eliminate all trouble.

Editor.

USE OF ACETYLENE IN TRENCH GUNS.

Mixtures of acetylene and air in various proportions are explosive, and use is made of this property in an invention by R. A. Breviaire, of Paris, relating to Trench guns. The invention, one form of which is shown in the accompanying drawing, consists in charging the explosive chamber of the gun with an explosive gaseous mixture, such as one formed of air and acetylene, which is ignited by such means as an electric sparking plug or by a briquette of ferro-cerium.

In the form shown, air under pressure is admitted to the chamber G through a non-return valve F for the purpose of scavenging the gases arising from the previous explosion and filling the chamber with pure air. The shell M is then inserted through the muzzle of the gun and rests upon a shoulder B, after which by turning a cock in the tube C, a charge of acetylene suitable for the desired range is injected



through the tube C and non-return valve E from a cylinder D of dissolved acetylene.

The mixture of air and acetylene is then ignited by a sparking plug J connected to an electric battery L. To prevent flame and noise, the muzzle is provided with holes H which open into a chamber K having front and rear openings. The barrel may be surrounded by spirals of aluminium wire to deaden vibrations of the metal. Vanes N are provided on the shell M when the barrel A is not rifled.—By D. R., in *British Acetylene and Welding Journal.*

SCRAP RECLAMATION.

It has not been so long ago since most plant managers, superintendents, and owners regarded anything thrown into the scrap-pile as waste, beyond reclamation.

Probably two things have contributed more than anything else to change their opinions of waste—war and modern welding processes.

In ordinary times the scrap-pile is a neglected avenue for the escape of profits. Now that war has pushed up the prices of raw material to dizzy heights, the American plant owner and factory man have begun to analyze their scrap heaps. Usually they find huge accumulations of damaged or worn machinery tools, "short ends" and other material that represents considerable profit thrown away. Face to face with labor shortage, metal shortage and the time factor plant owners are reclaiming these worn and damaged machines and broken tools and putting them back to work earning profits.

Are You a Real Welder?

We want to know more about the **real** welders who make up The Welding Engineer's big family of readers. We want to see a sample of your work. If you believe your method of welding is correct, write me today, and I will send you a specimen of ½" by 2" steel, bearing a stamped number, and which you may weld and return to me. I will test your specimen thoroughly, and when I finish the test I may be able to tell you something about your weld which you should know.

This is the Plan

The specimens we test must, of course, be uniform, or a fair comparison could not be drawn. You write to me, telling me that you would like to send in a sample of your work, and I will send you two pieces of ½" by 2" tank steel. The pieces will be stamped with a number, and throughout the test your number will be the only reference given to specimens. If your number is 71 you will read in The Welding Engineer the result of the test of specimen No. 71. You know it's your sample and I know, but no one else. When we test your specimen, we will do more than criticize, we will offer helpful suggestions. The purpose of the plan is constructive, not destructive.

Things We Must Know

1. What torch and what sized tip you use.
2. We want a six-inch piece of welding wire used.
3. You must weld only from one side, and you must not anneal. Pieces welded from both sides and annealed will be thrown out.
4. Do not reinforce weld more than 1/16", and do not grind it. We want to see the weld in its original state.
5. It might be well to carefully weld the edges of test pieces, to prevent cracks starting at any laps that might exist. The edges of the specimen however, should be left square and full.

After the test the specimens will be returned to you with a full report of our findings.

Only Twenty Each Month

Because of the labor involved I can only supply 20 samples each month. They will be issued in the order in which applications are received. Results will be announced as soon after the receipt of specimens as possible.

Write for your specimen today. Remember—only 20 each month.

L. B. Mackenzie, Editor
The Welding Engineer
608 S. Dearbern Street, Chicago, Ill.

Recently an engineer for an oxy-acetylene concern made an investigation in a western mining field. At one big mine he found in the scrap-piles, dollies and dies for drill sharpening, worth $9 each, which could be welded and put into service at a cost of about $1 each. The mining company was on the anxious seat, too, as to when it would be able to get more new material. It was found that the scrap heap would yield a three months' supply, of good material, in a year's scrap accumulation.

At another time the engineer found a year's supply of tram buckets, worth $40 each, with broken bottoms, that could easily be repaired by welding at a slight cost. In addition he found a three months' supply of stamp stems and short ends of tunsten steel, which could be welded and give a year's supply. He found crusher plates Manganese steel worth $20 each, slightly too big for the machines then in use, but which could be cut down by

New Officers International Acetylene Association, Left to Right, H. S. Smith, Vice President; J. T. Earl, President; A. F. Jenkins, Retiring President; A. Cressy-Morrison, Secretary. Treasurer.

the oxy-acetylene process at small cost, and put into service again at an enormous saving.

The various processes of welding have made it possible to reclaim an enormous amount of metal machines and tools that formerly were sold as waste, and at a fraction of the original cost. Nowadays any kind of metal—steel, iron, both cast and malleable, brass, bronze, copper, aluminum, sheet iron and precious metals such as gold, silver, and platinum can be welded and broken parts made as good as new.

At a heat of 6,300 degrees, Fahrenheit, produced by the combustion of acetylene in oxygen, any of these metals fuse and run together, a virtual remoulding of the parts.

A railroad company had a big accumulation of scrapped driving wheels for locomotives, most of which had cracked spokes. The demand for more rolling stock, caused by war pressure, caused the company to reclaim these wheels and the oxy-acetylene welding process did the work, saving the road several thousand dollars and making it much more in profits through putting discarded engines to work.

A big milling concern rummaged its scrap heap and discovered a quantity of discarded gear-wheels—castings with teeth broken out. At a trifling cost new teeth were fused into the castings, making them good as new and saving the concern an enormous amount of time.

America is said to have the biggest scrap heap in the world, but as conservation is the scrap heap's worst enemy it is expected to be greatly reduced before the war is over. Perhaps by that time the nation will have learned how to turn metal scrap into silver dollars.

WAR SERVICE IN BALLOON DIVISION

Hereafter when you have occasion to greet Lieut. Paul Pleiss make it Captain please. Captain Pleiss will be remembered as an important member of the Burdett Oxygen Co. organization. Some months ago he was commissioned a first lieutenant in the Hydrogen Bureau, Balloon Division, Signal Corps. Captain Pleiss is now in charge of the bureau. In a letter to the editor of *The Welding Engineer* the captain says:

"Because your readers are mostly technical men there are excellent opportunities for them in the Balloon Division and such publicity as you can give to the fact that applications are sought for balloon service would be appreciated."

A circular issued by the War Department follows:

WAR DEPARTMENT.

Office of the Chief Signal Officer,
Washington, September 26, 1917.

Balloon Section:

All inquiries from prospective candidates concerning procedure for securing commission in balloon section of the Air Division should be answered according to the following paragraphs.

C. DeF. Chandler,
Colonel, Signal Corps.

---

1. Candidates for commissions must be between the ages of 19 and 35 years, although in exceptional cases older men who are already competent balloon pilots or having special qualifications may be accepted. A few officers are needed in non-flying capacities, such as gas engineers; applicants who are over age for aerial training or having physical defects of a nature which would not prevent the fulfillment of non-flying duty may be commissioned in that class provided professional and moral requirements are satisfactory.

2. The application form must be accompanied by three letters of recommendation from well-known citizens in the community where applicant resides, preferably his teachers or employers. The examining board usually makes confidential inquiries to insure satisfactory moral qualifications.

3. Applications for commission should be forwarded to the Chief Signal Officer of the Army, Washington, D. C., or to one of the following department aeronautical officers:

Department Aeronautical Officer, Central Department, Consumers Building, State and Quincy Streets, Chicago, Ill.

Department Aeronautical Officer, Northeastern Department, 25 Huntington Avenue, Boston, Mass.

Department Aeronautical Officer, Southeastern Department, Charleston, S. C.

Department Aeronautical Officer, Southern Department, Fort Sam Houston, Texas.

Department Aeronautical Officer, Western Department, San Francisco, Cal.

Department Aeronautical Officer, Eastern Department, 87 Nassau Street, New York City, N. Y.

4. Upon receipt of application for commission, it is usually referred to the examining board nearest to applicant's residence, which board then instructs the applicant regarding time and place for taking physical examination.

5. The physical examination for service in balloon branch is the same as for candidates desiring airplane training, except that certain physical defects do not disqualify for balloon section.

6. Upon satisfactorily passing the physical examination, the applicant is questioned by the board concerning mental qualifications, and he should present school and college diplomas or certificates of courses completed as evidence of education. Candidates who are not in every way qualified to become officers of the United States Army will not be recommended by examining board.

7. After the examining board determines that the applicant is qualified to fulfill the physical, mental and moral requirements, the papers are forwarded to the Chief Signal Officer of the Army, recommending commission as second lieutenant, Aviation Section, Signal Officers' Reserve Corps, "after satis-

American Girls "Doing Their Bit." For some time our Allies have employed women welders. The girls in the above picture are employed in the shop of the Austin Welding Works, Chicago. They are using IMPERIAL WELDING EQUIPMENT.

Simplicity and Economy are paramount considerations in the construction of Imperial Welding and Cutting Apparatus. When more serviceable apparatus is built *Imperial* will build it. We always carry a complete stock of apparatus—we ship on short notice. Your supply orders will receive unusual attention. In fact you will like to do business our way.

The Imperial Catalog is Yours for the Asking.

The Imperial Brass Manufacturing Co.

522 South Racine Avenue Chicago, U. S. A.

factorily completing the course of training in ballooning," except for those already qualified.

8. All accepted candidates are enlisted in the Signal Corps or Signal Enlisted Reserve Corps. This holds them for a period of training which covers the course at the balloon schools up to the time when, having satisfactorily completed it, they are commissioned. During the course of training the candidates for commission has the rank of private, first class, but he may at the option of his commanding officer receive temporary appointment in other grades as may be required by the organization of the school squadrons. These temporary grades, however, do not carry extra pay, warrants, or commissions, and are only for the instruction of those detailed.

9. The course of instruction at balloon schools consists of theoretical and practical ballooning, including qualification as a spherical balloon pilot, according to regulations of the International Aeronautic Federation, maneuvering of captive balloons and frequent ascents for instruction in observation, meteorology and its application to aerial navigation, weather charts and maps, manufacture of hydrogen by various processes, military drill, army paper work, motor vehicles and other subjects relating to military ballooning.

10. The candidate may be discharged at any time during his course of training by reason of failure to pass tests or examinations, by giving evidences to his commanding officer that he is unfitted either mentally, morally, or physically for the duties of a balloon officer, or for any other reason which shall in the opinion of the examining board, and subject to such approval as is necessary, render his services no longer desired. The actual mental and physical requirements for a balloon officer are so great, his ability to do several things at once, and do them all and accurately, are so essential that discharge is not necessarily any reflection on the man's character, loyalty or devotion to duty.

11. From the time when the candidate is assigned to duty at a balloon school until he is discharged or has passed all tests and is recommended for his commission he receives the pay and allowances prescribed for candidates under the provision of Special Regulations 49, War Department, 1917, except that the allowance for rations is 60 cents daily instead of 75. The pay, however, remains at $100 per month. This rate includes his regular pay as private, first class, and is not in addition to it.

12. When the commandant of the balloon school reports the satisfactory completion of the instruction, it operates to forward the original papers for issue of the commission as second or first lieutenant.

13. The pay for a second lieutenant is $1,700 per annum in all branches of the army.

14. Upon receipt of his commission the officer should execute the oath of office, which, with a letter of acceptance addressed to the Adjutant General, should be forwarded to this office for transmittal. This, however, is not sufficient to complete the duty status of Reserve Corps officers. Shortly after the acceptance of commission is received at the War Department an order is then issued placing the Reserve Corps officer on active duty, with instructions to report to some station. Pay and active duty status begin from date the officer complies with the War Department order.

15. Commissioned officers in the Balloon Section, on duty requiring them to participate regularly and frequently in aerial flights, shall receive an increase in pay of 25 per cent. Such officers, when qualified, may be rated as Junior Military Aeronauts, which gives them the rank, pay, and allowances of one grade higher than that under their commissions, if their rank under said commissions be not higher than that of captain; and while on duty requiring them to participate regularly and frequently in aerial flights, they will receive an increase of 50 per cent in pay.

WOMEN WELDERS IN CHICAGO.

It is no novelty to find women employed as welders in foreign munition plants, factories, etc., but so far as we know the practice of introducing the feminine element into the trade in the United States had not gained much headway, perhaps for the very good reason that up to this time there has been no necessity for departing from old customs. No doubt the future will bring us face to face with a situation which will compel American manufacturers to follow the lead of our allies; in fact, in other branches of the iron and steel and mechanical world this is being done.

Women are being employed in various plants and factories in the United States as welders, but on a very small scale. It has remained for Mr. R. W. Austin, of the Austin Welding Works, 613 W. Jackson boulevard, Chicago, however, to introduce the

practice into this city. Finding himself confronted by the necessity of securing welders to turn out some government work, and being unable to secure men welders, Mr. Austin took a short cut to a solution of his problem. The ladies shown in the accompanying illustration, under the careful tutelage and watchful eye of Mr. Austin, are turning out very creditable work and the contract will be finished on time. Imperial apparatus is being used. No doubt in the future, in addition to a few other troubles, manufacturers of torches will be called upon to turn out apparatus appropriately decorated in pink, mauve, heliotrope and other shades dear to the hearts of the ladies.

THE NEW "REGO" CATALOG.

Catalogs showing regulators, gauges and accessories for use in connection with oxy-acetylene welding are by no means rare, but for the first time in the history of this young and growing industry regulators and accessories have been made the subject of a special catalog, which is not only artistic in appearance, but also comprehensive in its scope. Regulators for every purpose are illustrated and described. There are large regulators and small ones, regulators for acetylene, for oxygen and for hydrogen. There are regulators for welding, for cutting, for lead burning and for carbon burning. There are gauges, nipples and valves, adapters and fittings for every purpose. Every regulator is carefully, almost minutely described. All particulars are given about every coupling and fitting. Running through the catalog a fund of information will be found about the principle, the operation and the care of reducing valves. This book is not only a catalog of welding instruments, but a text book on reducing valves also. "Rego" instruments are divided into classes, representing the gas to be regulated —oxygen, acetylene and hydrogen. Oxygen gauges are divided into two groups—"high and low," according to the range of delivery pressure. Some very timely and interesting points are brought out relating to the use of gauges of proper classification, safety, care of instruments, etc., which should be studied by every welder. We advise the trade, if not already supplied, to send for this book.

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AND ASSOCIATED COMPANIES

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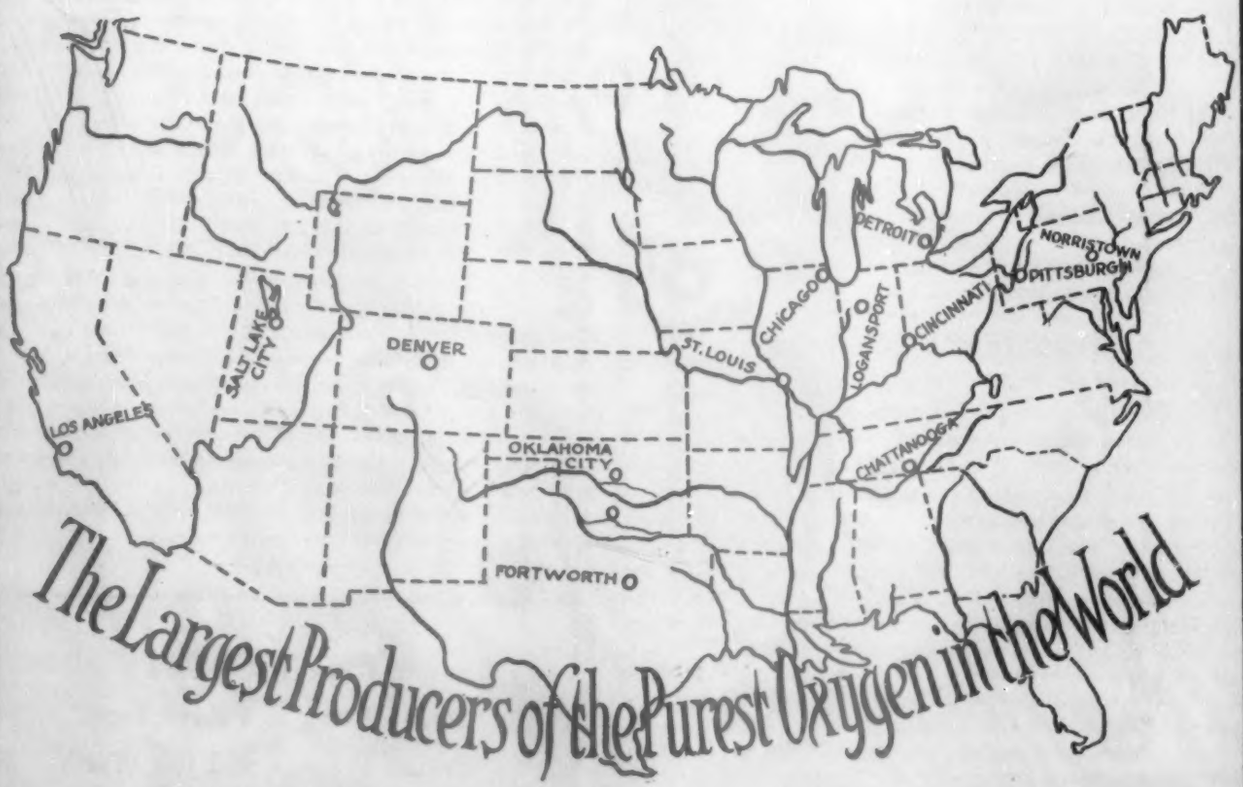

The Largest Producers of the Purest Oxygen in the World

PROPER GOGGLES FOR THE EYES

Oculists tell us that the ultra-violet light ray is the most harmful. A careful study of the ultra-violet light ray and all harmful light in general has been made for the purpose of producing a scientifically correct colored glass for the eye. It is stated that a large percentage of the colored glasses in use today to protect the eyes from glare are not only inefficient, but are decidedly injurious.

The light rays that are so harmful to the eyes are found particularly in the flames and lights used in industrial processes. The oxy-acetylene flame is rich in the very harmful ultra-violet ray and the carbon arc even more so. The cobalt-blue glass, which has been used quite largely for protection to the eyes, is found to transmit the harmful rays almost as freely as clear glass, even though the eye may not detect the glare and the operator makes no complaint as to using them. Unfortunately, the eye alone is incapable of selecting the best glass, because the harmful rays are largely invisible and slightly varying colors may be very different in their effect on the eyes.

Some idea of the effect of the ultra-violet rays on the eye may be realized when we learn that it is these rays in sunlight which produce sunburn. In a similar way the outer membrane of the eye may be destroyed by the radiation from the quartz mercury arc, the carbon arc or the oxy-acetylene flame. Proper colored glasses in goggles will neutralize the most dangerous light rays.—American Machinist.

NEW PREST-O-LITE BOOKLET.

A highly interesting booklet has just been issued by the Prest-O-Lite Co., of Indianapolis, Ind., the title of which is "The Gas of a Thousand Uses." The contents consists of a very thorough description of the many and varied uses to which acetylene is being put. It is very beautifully and thoroughly illustrated and describes in detail the apparatus which is used in connection with acetylene consumption.

NEW BOOK ON WELDING AND BRAZING.

The Hauck Manufacturing Company, 101 Eleventh St., Brooklyn, N. Y., have issued a new booklet the title of which is "Welding-Brazing at the Least Cost," the number of the booklet being No. 93-W. The book is thoroughly illustrated and describes many and various means of preheating, brazing, melting, etc. The subject of fuel conservation is now an important one and welders will do well to send for this booklet, which will be sent upon application.

IMPORTANT D-B CHANGES

The Davis-Bournonville Co., with general offices and factory at Jersey City, has taken over the plant and factory of the Davis Acetylene Co. at Elkhart, Ind. The Davis Acetylene Co. has been dissolved and the manufacture of acetylene lighting generators and accessories discontinued. The plant will hereafter be operated under management from Jersey City for the manufacture of acetylene pressure generators for the oxy-acetylene process, and for special products. The Canadian factory at Niagara Falls, Ontario, which has been jointly occupied by the two companies, has also been taken over, and will be operated exclusively for the manufacture of oxy-acetylene apparatus for the Canadian trade. The Davis-Bournonville Co. has also purchased the H. G. Kotten Co. factory and grounds opposite its Jersey City property. This gives the purchaser half of the city block running through from Van Wagenen to Corbin Avenues, and half of the block from Corbin to West Side Avenues. The Kotten factory will be used for manufacturing electrolytic oxygen apparatus and accessories, releasing considerable space in the company's new factory building for increased output of oxy-acetylene welding and cutting apparatus. A four-story warehouse 60x100 feet, of brick and mill construction, will be immediately erected on the Kotten property, still leaving ground for a five-story factory, 6x150 feet, corresponding to the company's No. 3 factory, recently completed, which may be erected the coming year.

TURNING WASTE INTO PROFIT.

"Turning Waste into Profit" is the title of a new book just issued by the Prest-O-Lite Co., Inc., of Indianapolis, Ind.

It is devoted exclusively to the possibilities of reclaiming broken and worn machinery and metal parts for service by the oxy-acetylene process and is the most complete and comprehensive book ever issued on this subject.

Containing eighty-two illustrations, it pictures and describes representative examples of reclamation welding work in practically every field of the industrial world.

In the face of present high prices and scarcity of metal equipment, the subject of welding it receiving more than usual consideration and this new book is truly a beacon to plant owners interested in the efficiency of holding down the "scrap heap."

It is mailed to any interested executive upon request.

HAUCK COMPANY IN NEW PLANT.

The business of the Hauck Manufacturing Company, Brooklyn, N. Y., has grown in such leaps and bounds through the past 17 years that they have been established, that they have been obliged to build a new modern brick, steel and concrete building, occupying 15,000 square feet, at 101-113 Eleventh Street, the old location being at 140 Livingston Street. This is a convenient location in Brooklyn, close to the water front and also close to all of the railroad terminals and to the new Brooklyn marginal railroad route. The company announces that they are now in a position to take better care of their customers and orders, with enlarged and increased facilities and specialized machinery and labor saving equipment. This company issues a great many different bulletins and catalogs showing and describing the use and application of Hauck kerosene oil burners for every possible welding and repair shop requirement.

SAFE BLOWER USED TORCH

Mr. A. J. Emerich, of the American Welding Company, Chicago, recently discovered an unusual use to which an American cutting torch was being put. A short time ago a safe in a Kansas town was cut open and valuables stolen. The operator left his torch behind, which the police discovered bore the stamp of Mr. Emerich's company. Upon being interviewed by detectives, Mr. Emerich recalled a particularly industrious student who had purchased an outfit a short time previous. It was recalled that he always wore gloves, which enabled the detective bureau to identify him as an old safe blower, whose hands are marked by acid.

NEXT MONTH

"Steel Cutting in a Navy Yard"

"British Welders and the War"

Ampco Bronze Welding Rods

The First Known Universal Welding Material

AMPCO BRONZE is known to the trade as the only bronze metal in the world possessing a greater strength than steel. It is also an acid resisting metal and is the very best bearing metal.

For the uses of the welder it is much superior to any other bronze welding material. It is also much safer and healthier to use as it does not throw off any fumes in welding as other bronzes. With the aid of AMPCO BRONZE WELDING RODS the welder may turn out welds of greater strength and with various metals than heretofore obtainable. Welding copper, bronze, cast iron, malleable iron and steel.

MR. KOPFERSCHMIDT, Master Welder of the Michigan Central Railroad, and a regular contributor to The Welding Engineer, says:

"With the aid of Ampco Bronze welding rods, bronze bearings can be repaired to a good advantage. Worn spots can be built up, giving a very hard surface. All sorts of bronze and brass castings can be welded with Ampco. In fact, broken brass, bronze or malleable castings can be welded with Ampco Bronze rod better than with Tobin bronze, or other bronze welding rods. I will gladly recommend Ampco to other welders. B. KOPFERSCHMIDT."

AMPCO BRONZE WELDING RODS are no more expensive than ordinary bronze rods, furthermore, Ampco Bronze is 20% lighter in weight than any other bronze in the market. We want you to try Ampco Bronze Welding Rods. Write for trial order and prices.

Ampco Rolling Mills Corporation

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OXY-ACETYLENE APPARATUS

WELDERS

MANUFACTURERS

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Welding and Cutting Apparatus, Acetylene Generators, Lead Burning, Platinum Melting and Carbon Cleaning Outfits.

Gas and Oil Preheating Torches and Welding Fluxes, Rods, etc.

Write for Catalog.

Henderson-Willis Welding & Cutting Co.

2305-7-9 N. 11th St.
St. Louis, Mo.

Oxygen and Hydrogen

At Less Cost Than Ever Before

That's what the new **I. O. C. Type 4-1000 Unit Generator** will give you. Think what that means, in these days when all costs seem to be advancing. And, with a **Type 4-1000 Unit Generator** set, you'll not only get cheaper gases—you'll get purer, more efficient gases—you'll be able to vary your output over a range of 5 to 1 by varying your current—you'll be free from delays and losses due to interruptions in cylinder service. Let these facts sink in. Then—

Write for the Type 4-1000 Bulletin

International Oxygen Co.

115 Broadway, New York

London:—Arthur Lyon & Wrench, Ltd., Caxton House, S. W.

TRADE NEWS.

At the recent annual convention in Boston, the American Foundrymen's Association elected Benjamin D. Fuller, of Cleveland, their president for the following year. Mr. Fuller is the superintendent of foundries of the Westinghouse Electric & Manufacturing Co.

Mr. C W. Johnson who was elected vice-president of the American Institute of Metals at their recent meeting, is general superintendent of the East Pittsburgh works of the Westinghouse Electric & Manufacturing Co.

Mr. H. I. Bateman, a welder who is shown at the left of the accompanying illustration, has joined the Royal Flying Corps. He is No. 150,280, No. 2 squad, Leaside Camp, North Toronto, Canada. He was formerly connected with the Canadian Prest-O-Lite force.

The International Oxygen Co., 115 Broadway, New York, announces the resignation of Mr. P. J. Kroll as the company's representative for Pittsburgh and the middle western territory.

A meeting of the American Acetylene Welders' Association was held at Jackson, Mich., on November 7. Mr. Bemis, of the National Carbon Co., read a paper on "Carbon Products For Welding."

"Reactions," published quarterly by the Goldschmidt Thermit Co., 120 Broadway, is just off the press (Third Quarter Edition). As usual it is full of interesting information relating to Thermit welding.

Welders at Vallejo, Cal., have organized the Ox-acetylene Operators' Club, with twenty-one charter members. Every operator at the navy yard is a member. The object of the club is improvement of methods.

IN MEMORIAM.

Arthur Asa Hill.

Arthur Asa Hill died last month in New York City. His name is unfamiliar to the readers of *The Welding Engineer*, but some of his editorials in the *Blacksmith and Wheelwright* and *Automobile Dealer and Repairer* have been reprinted from time to time in the columns of this paper. He was an enthusiast on the subject of oxy-acetylene welding and cutting, preached its merits constantly through the columns of his paper and practiced what he preached in some construction work which he had undertaken shortly before his death. The oxy-acetylene industry is the loser by his demise.

I wish I had the power to convey to the readers of this paper the wonderful character of Arthur Asa Hill. Lacking it as I do, I feel that I would be remise in my appreciation did I not attempt to place on record some of the qualities of this lovable man.

His obituary notices in the columns of the New York daily press stated that he was born in the Cape Cod section of Massachusetts, that he at various times edited or owned daily papers in Massachusetts, that he became managing editor of the American Press Association and that at the time of his death, he was sixty-four years old and edited the two trade papers above referred to.

At sixty-four, he was as young as most men are at thirty-five. Editing two large monthly papers, he found time to be interested in, and to work actively for, the betterment of mankind. He held decided views in respect to the compensation of labor and

A Special Torch for Canadians

This new welding torch is the product of years of experience. It is made of the very best material by thorough mechanics. It is nicely balanced and dependable in every respect. This torch gives a perfect gas mixture, possesses the non-flash quality and is economical in operation.

This new torch is not an experiment— it has been in constant use in our own shops for many months and gives perfect satisfaction. Because we are manufacturing these torches in large quantities we can sell them at the low price of $10.00. Our guarantee of perfect satisfaction is included. Write for details.

Welding and Cutting Appliances and Accessories, Oxygen and Acetylene.

$10

Compressed Gas Company, Limited

Welding and Cutting Engineers

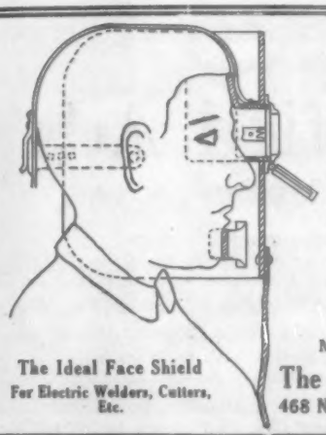
572 Howe St. Vancouver, B. C.

$10

Live Agents Wanted

For Oxy-Acetylene Welding and Cutting Equipment. Welding Torches, Cutting Torches, Generators. Supplies of all kinds for welding and cutting. Liberal commission.

Erie Welding Equipment Co.
Hamilton, Ohio



The Ideal Face Shield
For Electric Welders, Cutters, Etc.

Protect Your Eyes

The Ideal Face Shield is constructed of Aluminum and Vulcanized Fibre, resulting in durability and minimum weight. The operator can easily open the door containing the colored glass, making it easy to examine work. It's easy to see work without straining neck. Can be adjusted to fit any operator—no metal touches face. Gives free use of both arms and head—easy to adjust.

Write for full description and price.

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The Ideal Face Shield Co.
468 N. Garfield Ave., Columbus, O.

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to solicit subscriptions to The Welding Engineer.

More readers means more good welders—which is what is needed in the welding field.

Write today for details.

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Cast iron rods,	Norway steel,
Aluminum rods,	American steel,
Manganese rods,	Swede steel,
Tobin (drawn)	Aluminum solder,
Asbestos paper	Carbon blocks,
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Nickel steel	Goggles. Fluxes

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Quotation from a Report of the United States Government.

Department of Commerce

Technologic Papers of the Bureau of Standards, No. 93

(Issued May 5, 1917)

Glasses for Protecting the Eyes from Injurious Radiations

By W. W. Coblentz, Associate Physicist, and W. B. Emerson, Laboratory Assistant

The Gold Plated Glass is the most effective means yet produced for shielding the eye from infra-red rays. Data are given showing that of the infra-red rays emitted by a furnace heated to 1000 and 1100° C. about 99 per cent are obstructed by Gold Plated Glass, about 60 to 80 per cent by very deep black glass, about 60 per cent by greenish yellow glass. Exposure to excess of ultra-violet light is injurious, causing conjunctivitis. Glasses having a gray or neutral tint are the most agreeable to wear, as they do not alter the color of objects.

Pfund Welders' Goggles

Pfund lenses are the latest improvement in glass for welders. They are made up of a combination of a strong, colorless optical lens and a lens of Sir William Crookes glass, with a thin film of 14K solid gold in between. A special process of fusing makes this combination of the three practically as solid as a single piece of glass, and of even greater blow-resisting qualities.

The clear glass side of the Pfund lens is worn on the outside, the Sir William Crookes side is worn next the eye. The film of gold acts as a reflector of the harmful infra-red or heat rays, and transmits less than 2 per cent. The Sir William Crookes glass does its work by shutting out the ultra-violet rays. A large per cent of the visual light in welding operation comes from the incandescent sodium gases of the flux used to prevent oxidation. The bright yellow light may be absorbed without a marked loss in the visual and allow what is known as "seeing through" the flame. This special property of a glass is covered by the Pfund lens.

Price, Per Pair, $5.00

William C. Adams

Manufacturing Optician
332 Boylston St., Boston, Mass., U.S.A.

he lost no opportunity to place these views before the public.

His memory was remarkable. In the course of an hour's conversation, he would quote from perhaps a dozen poets and these quotations would be apt and correct. The breadth of his knowledge was great and a conversation with him was something to be treasured.

He talked ill of no man. If one of his acquaintances had a weakness, Mr. Hill would dilate upon his good qualities, keeping silent about the weakness. Always his hand was stretched out to help some unfortunate and while his manner at times was apparently brusque, his heart was full to bursting with love for his fellow man. If one did a small service for him, it was remembered and paid back a thousand fold. Deeply appreciative of the smallest of favors, he was reluctant to admit that the large ones he granted amounted to anything at all. Money meant little to him; friendship everything.

He was stricken down at his desk and this, I think, is as he would have it. He was not a dreamer but a worker, always a decade or two ahead of his fellow-man in ideas but striving by hard work to bring these advanced ideas into practice.

He was a man's man and just a few weeks before his death, talked seriously with me regarding the possibility of his going to the front in spite of his high blood pressure.

To know him was to love him. God doesn't often place men of his build on earth. The world is the loser and Heaven the gainer by his death, and I feel there must be a special Heaven for Arthur Asa Hill.

M. Keith Dunham.

New York, October 20, 1917.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of The Welding Engineer, published monthly at Chicago, Ill., for October, 1917.

State of Illinois, County of Cook, ss.

Before me, a Notary Public in and for the state and county aforesaid, personally appeared L. B. Mackenzie, who, having been duly sworn according to law, deposes and says that he is the Editor of The Welding Engineer, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, The Welding Engineer Publishing Co., 608 South Dearborn Street, Chicago Ill.

Editor, L. B. Mackenzie, 608 South Dearborn Street, Chicago, Ill.

Managing Editor, same as above.

Business Manager, same as above.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the name and addresses of stockholders owning o. holding 1 per cent or more of the total amount of stock.)

L. B. Mackenzie, 608 South Dearborn Street, Chicago, Ill.

M. J. Hungerford 608 South Dearborn Street, Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is ..... (This information is required from daily publications only.)

L. B. Mackenzie,
Business Manager.

Sworn to and subscribed before me this 24th day of September, 1917.

(Seal.) Hilda Hansen.

(My commission expires September 18, 1918.)

Classified Ads

Help Wanted—25c per line, minimum 4 lines.
Jobs Wanted—4 lines free.
Other Ads—50c per line, minimum 4 lines.
Count 8 words to line. Add 6 words for keyed address.

Wanted—Salesman to solicit subscriptions to *The Welding Engineer*, or furnish names of possible readers. Compensation good. Correspondence confidential. Write Mackenzie.

For Sale—One Prest-O-Lite acetylene tank Type W-K, 250 cu. ft. Atlantic Welding Co., 30 Church St., New York, N. Y.

For Sale—One acetylene generator, 200-pound carbide capacity, Oxweld duplex type, low pressure. Little used and guaranteed to be in excellent working condition. Hugh W. Dyar, 145 South Dearborn Street, Chicago. 1t-Nov.

Wanted—Men who understand oxy-acetylene welding to sell high-grade equipment. Liberal commission. Address N-4, care *The Welding Engineer*. 1t-Nov.

Wanted—An Oxweld, or a A-Davis Bournonville cutting torch; state conditions and lowest price. Address Wilkes-Barre Welding Co., Wilkes-Barre, Pa. 1t-Nov.

Position Wanted—Welder; 6 years' experience; married; age 33; will go anywhere. Wm. Manning, 510 East Leigh Street, Richmond, Va. 1tdh.

Wanted—A man thoroughly experienced in welding and cutting with oxy-acetylene; able to do first-class steel plant plate welding and having sufficient executive ability to look after two or three gangs of cutters. Give experience in detail. This position is in Nova Scotia, but steel plant men not liable to conscription. Address Mackenzie, care *The Welding Engineer*. 1t-Nov.

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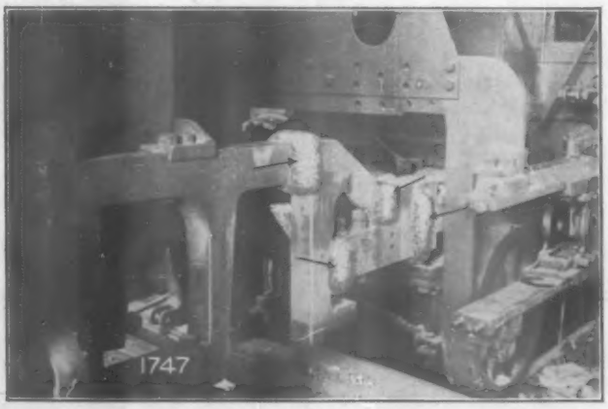
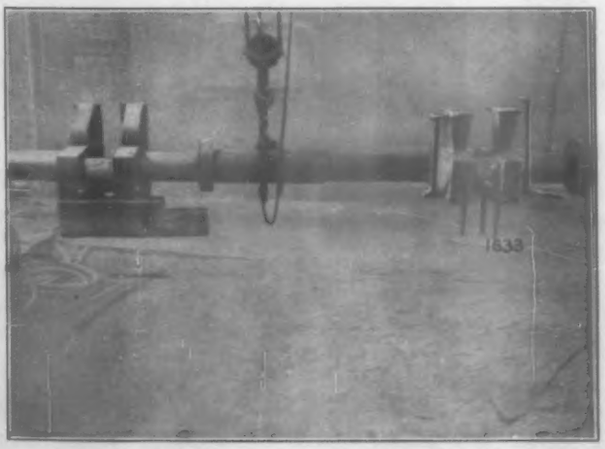


Four Thermit welds on locomotive frame on the Missouri Pacific Railroad, made without removing the frame from place.



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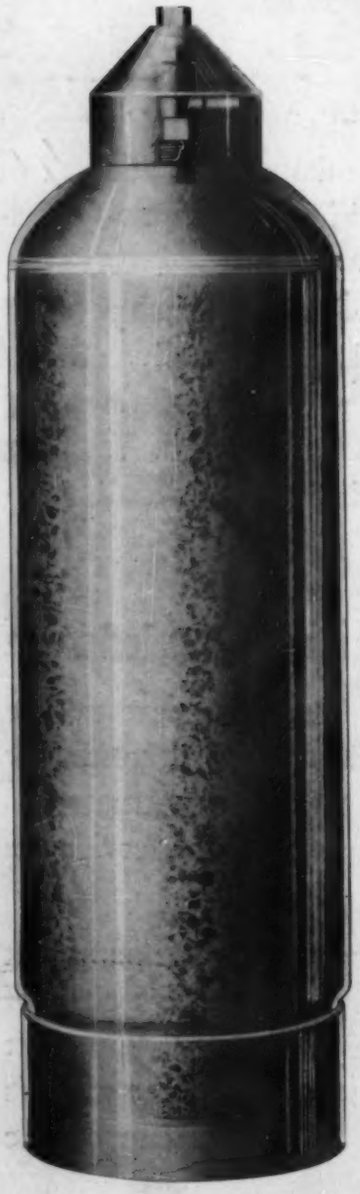
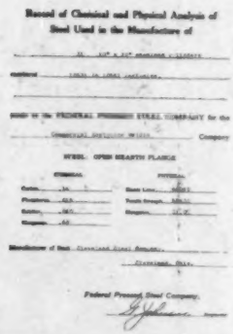


The Selection of the STEEL SHEETS



Record of Chemical and Physical Analysis of Steel Used in the Manufacture of

Federal Pressed Steel Company

from which the cylinder is to be made is naturally a most important detail. A special flange steel is used and a certificate issued by the steel mill for each lot selected.

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